

FIGURE 1A

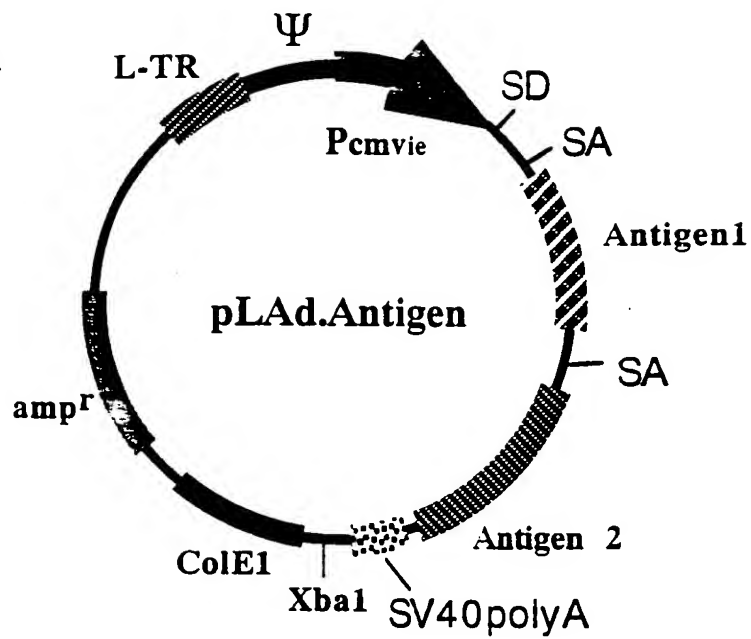


FIGURE 1B

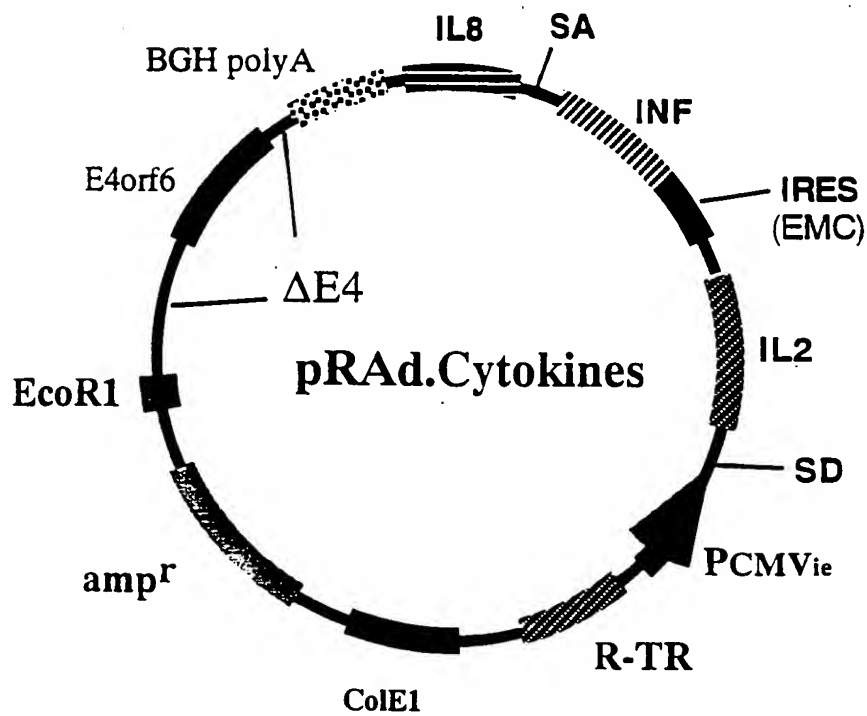


FIGURE 1C

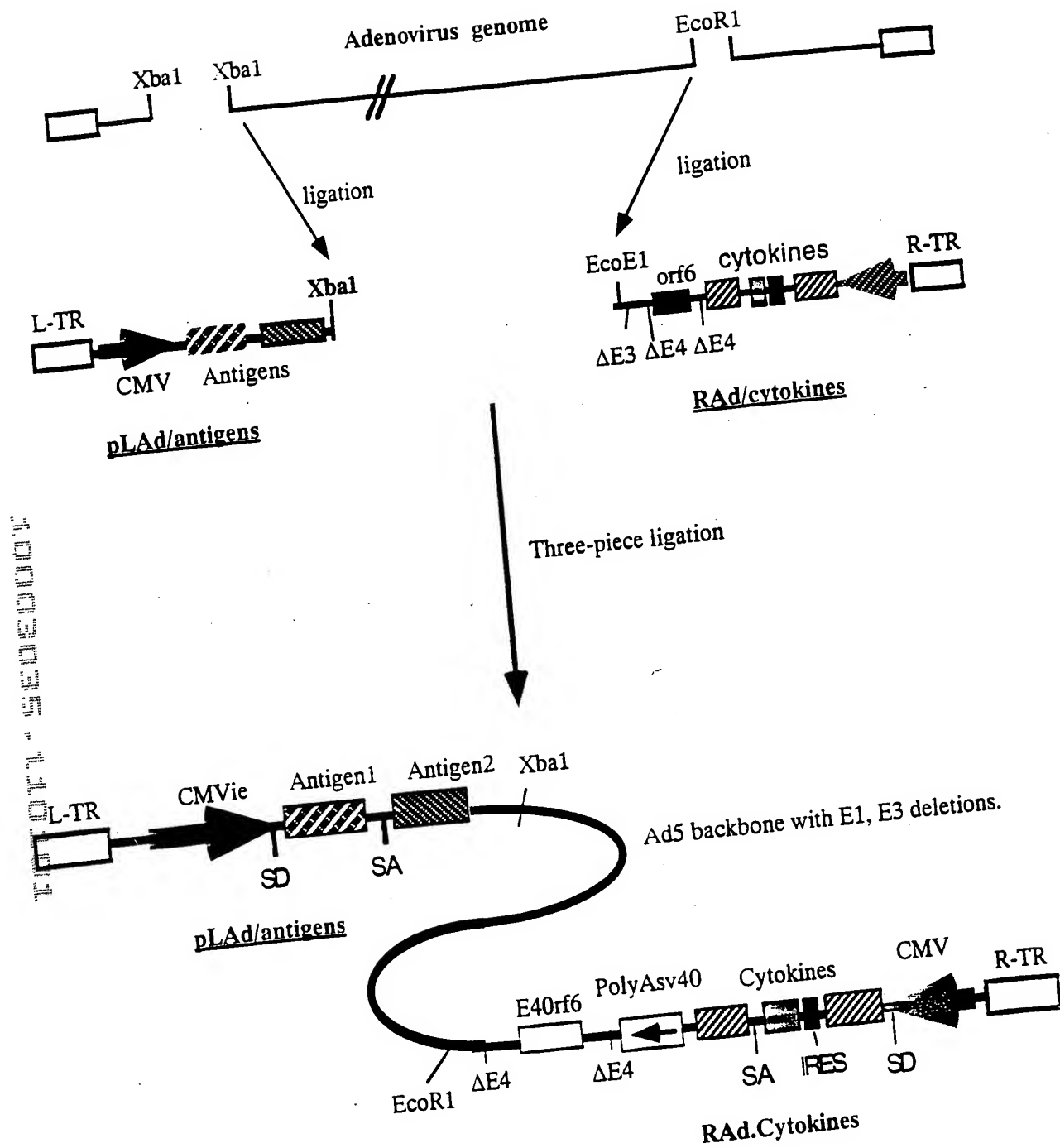
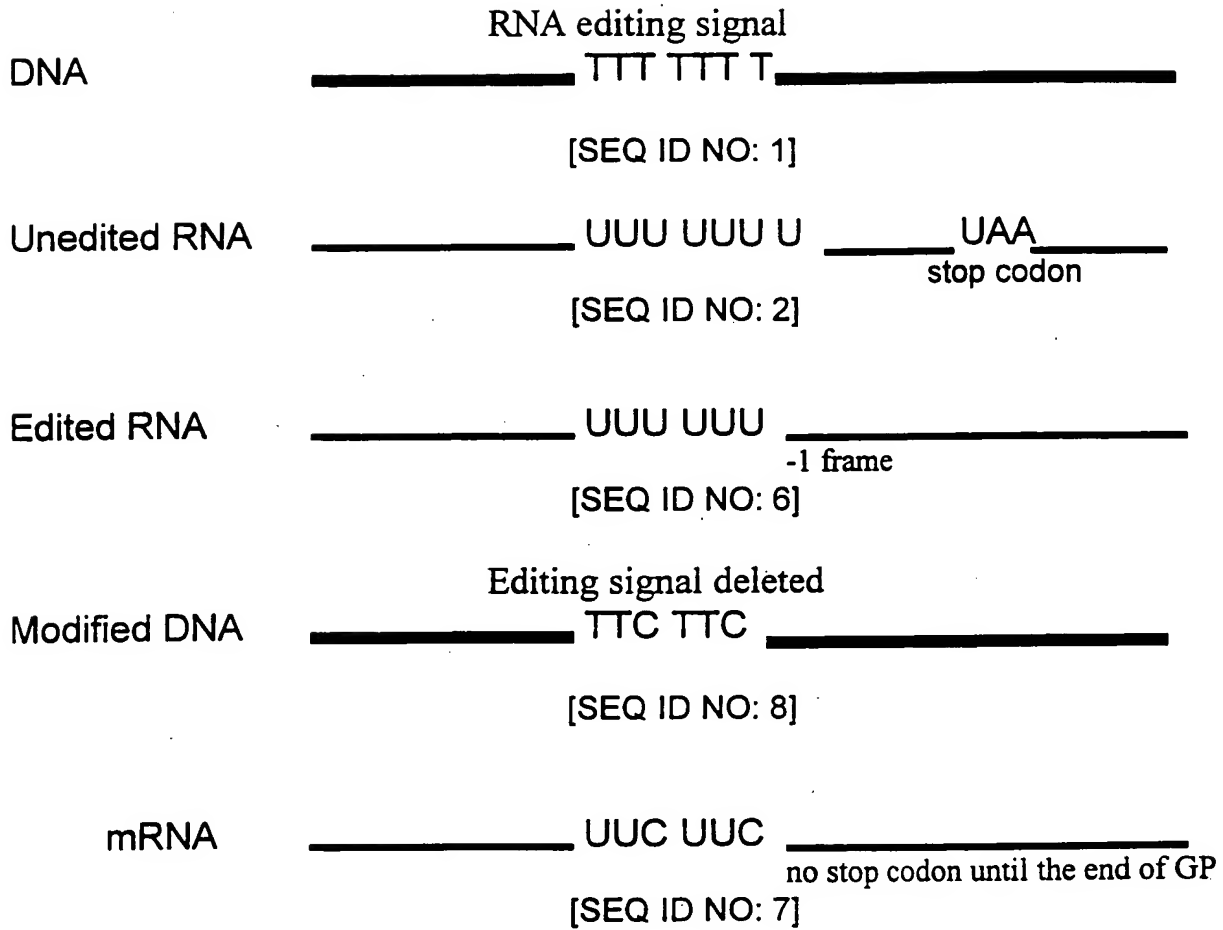


FIGURE 2



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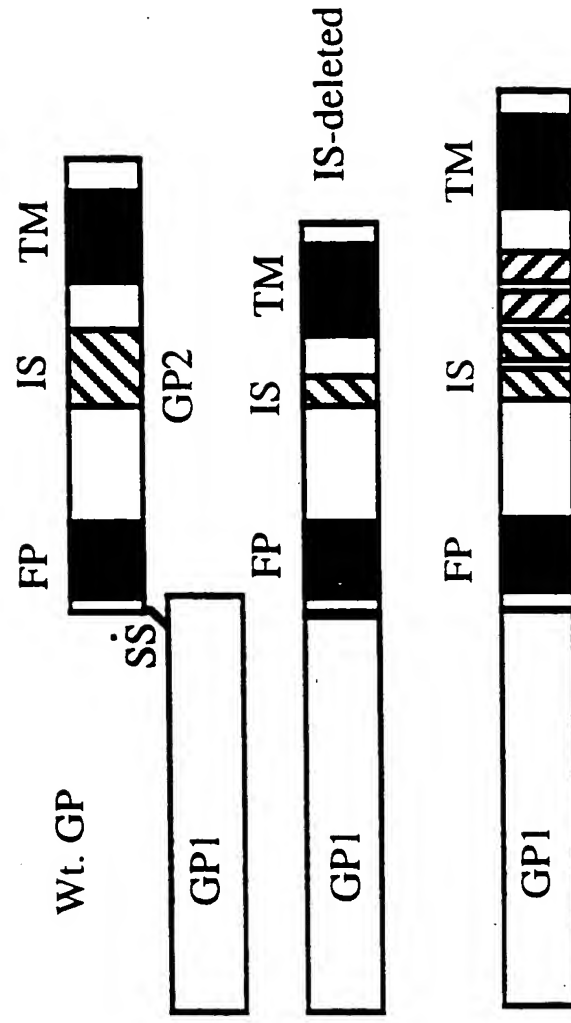
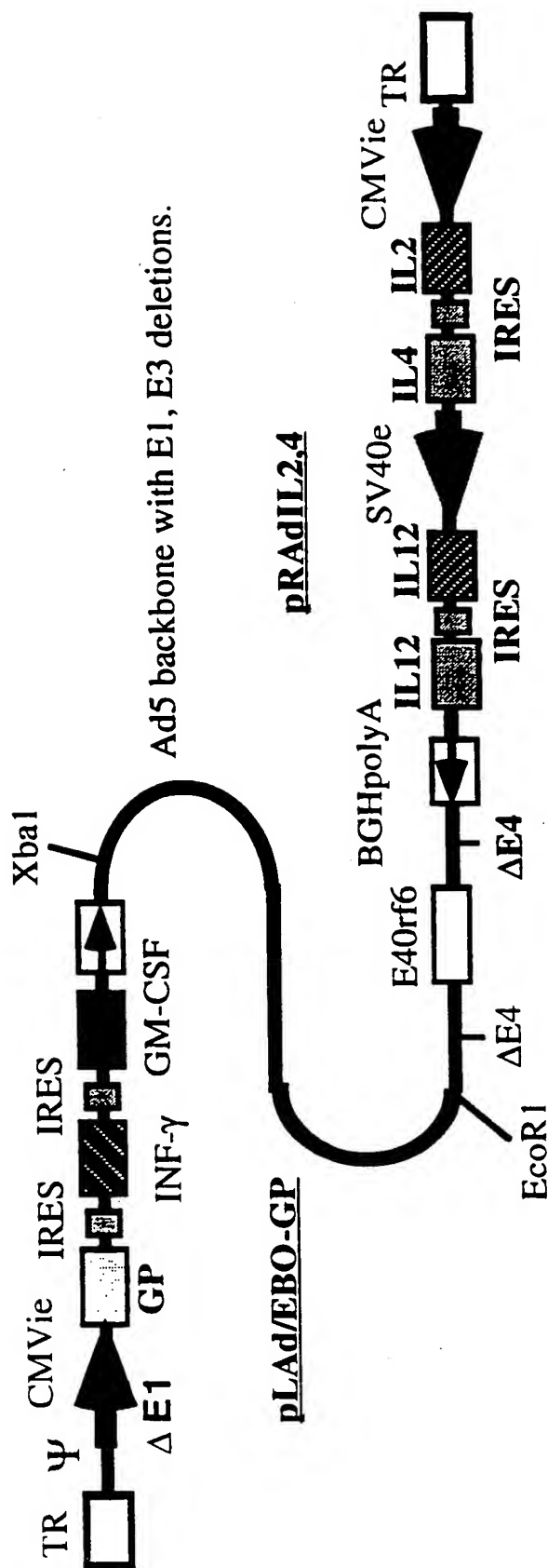


FIGURE 3A

FIGURE 3B

FIGURE 3C

FIGURE 5



Anti-HIV (tat,env) relative
(Group 3)

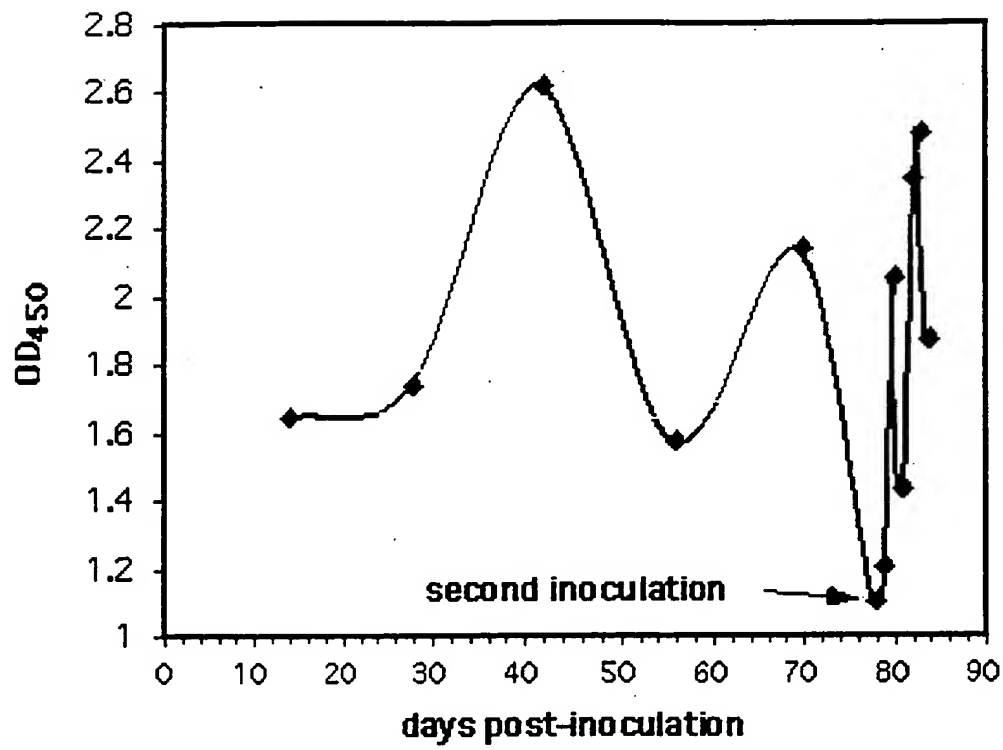


FIGURE 6

● Anti-HIV (tat,env) relative titer
(Group 4)

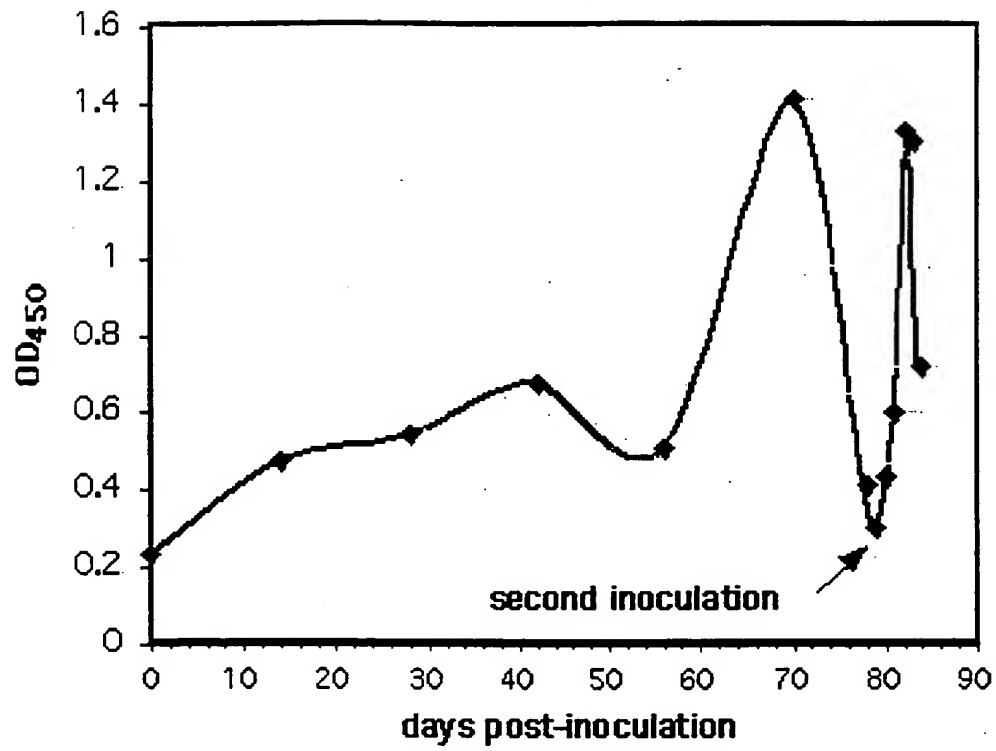


FIGURE 7

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IFN γ secretion from activated splenocytes in response to target cell stimulation

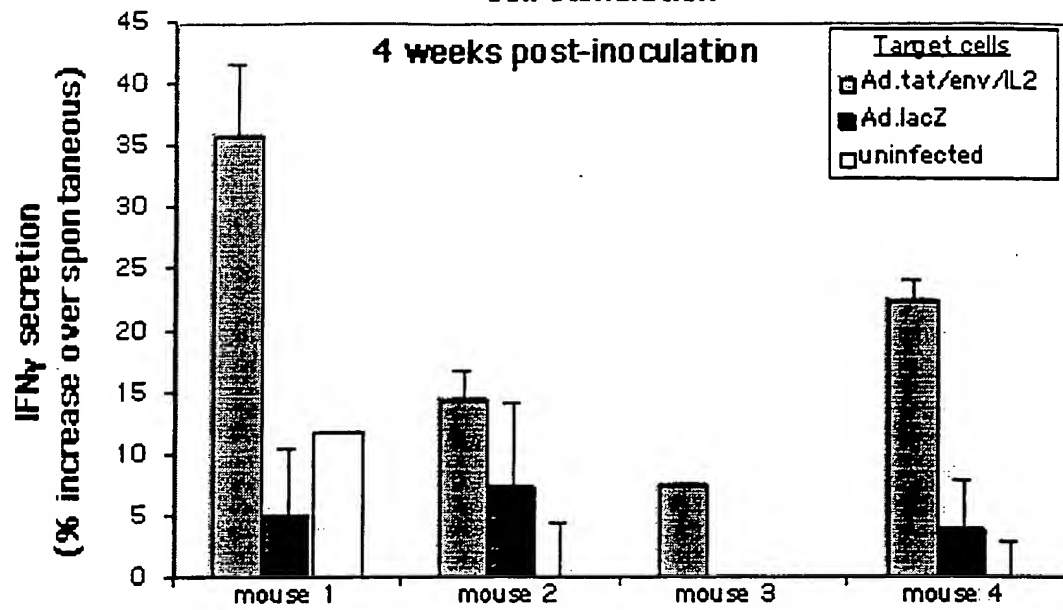


FIGURE 8A

10003035-110101

IFN γ secretion from activated splenocytes in response to target cell stimulation

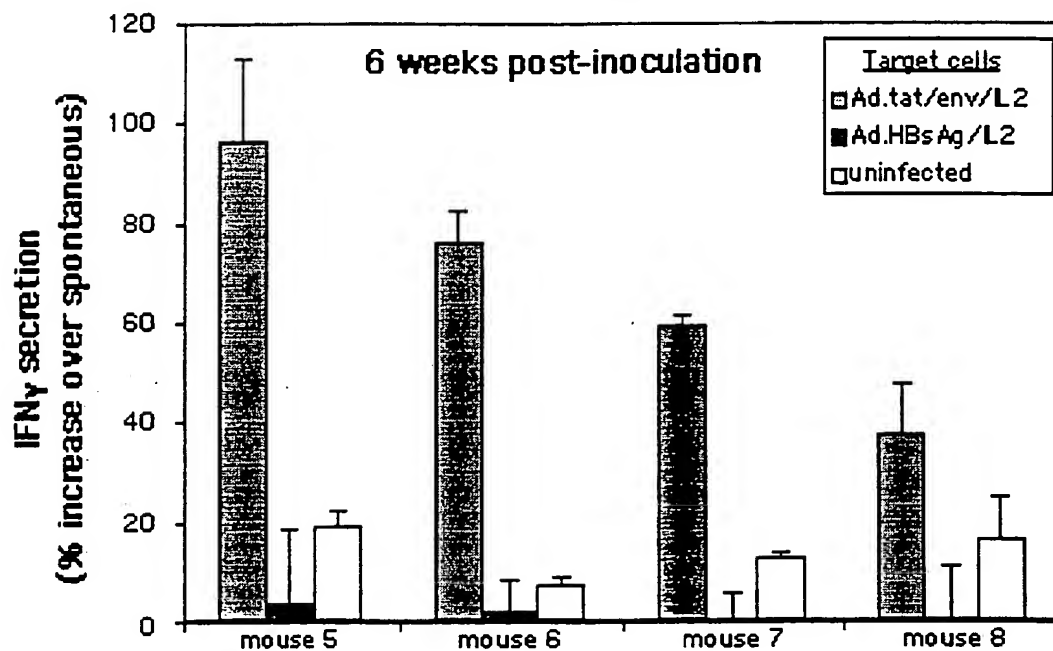


FIGURE 8B

[illegible]

Granzyme A secretion from activated splenocytes in response to stimulation with target cells

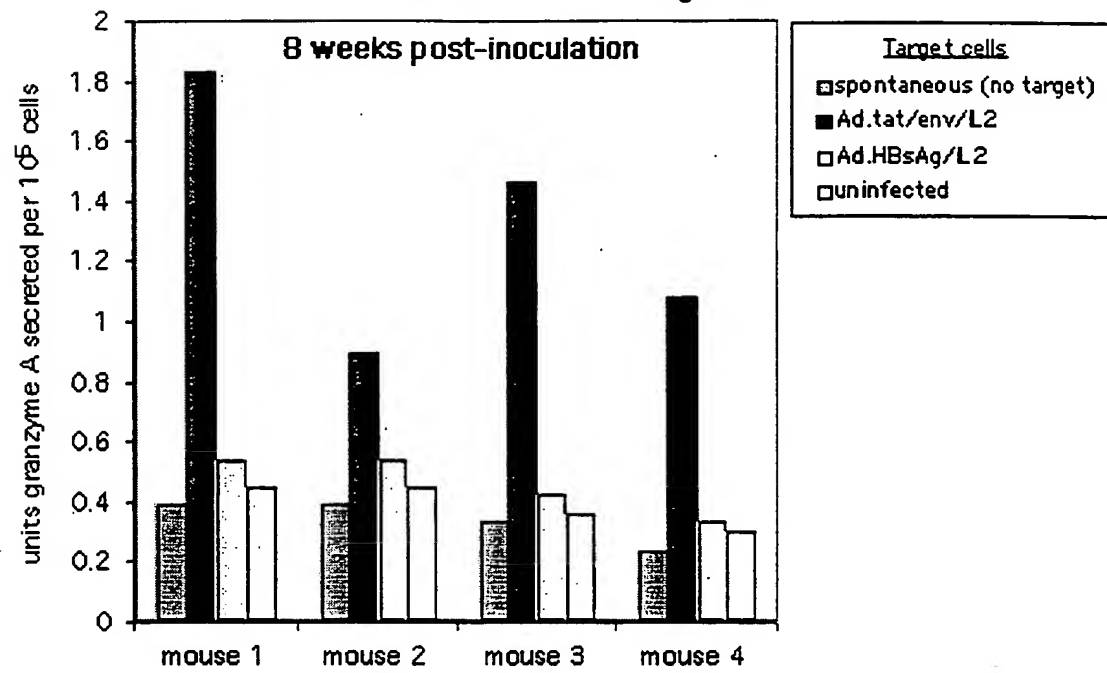


FIGURE 9

● Anti-HBsAg relative titer
(Group 1)

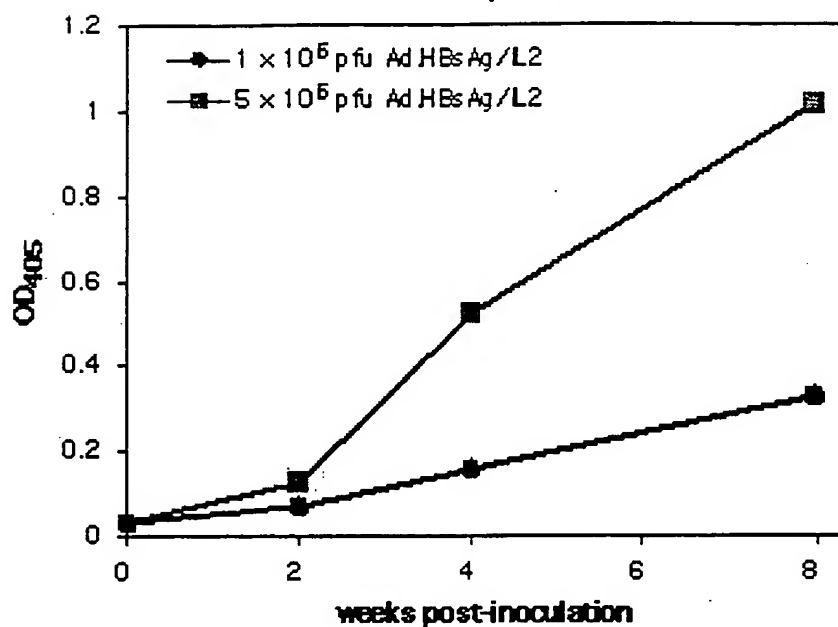


FIGURE 10A

Anti-HBsAg relative titer
(Group 2)

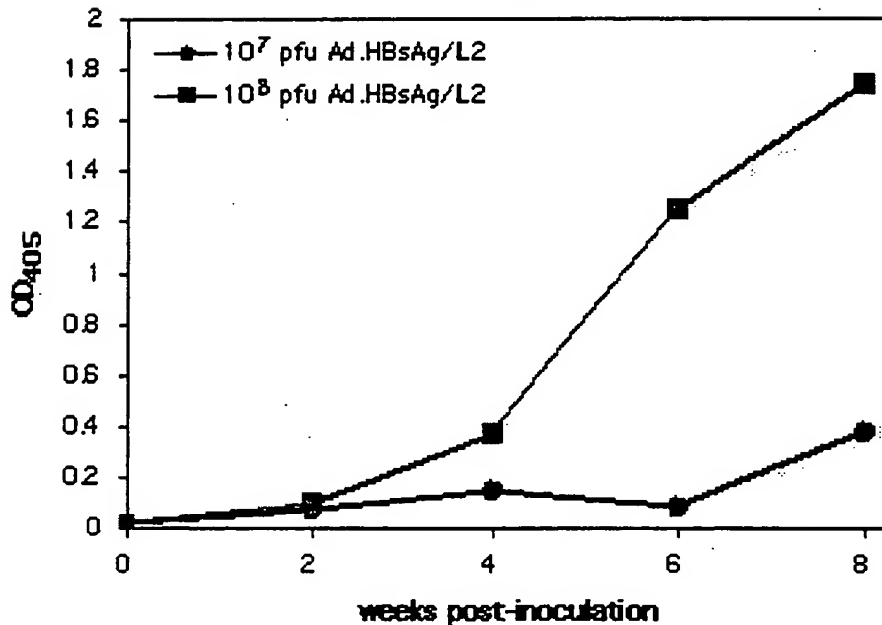


FIGURE 10B

Anti-HBcAg relative titer
(Group 3)

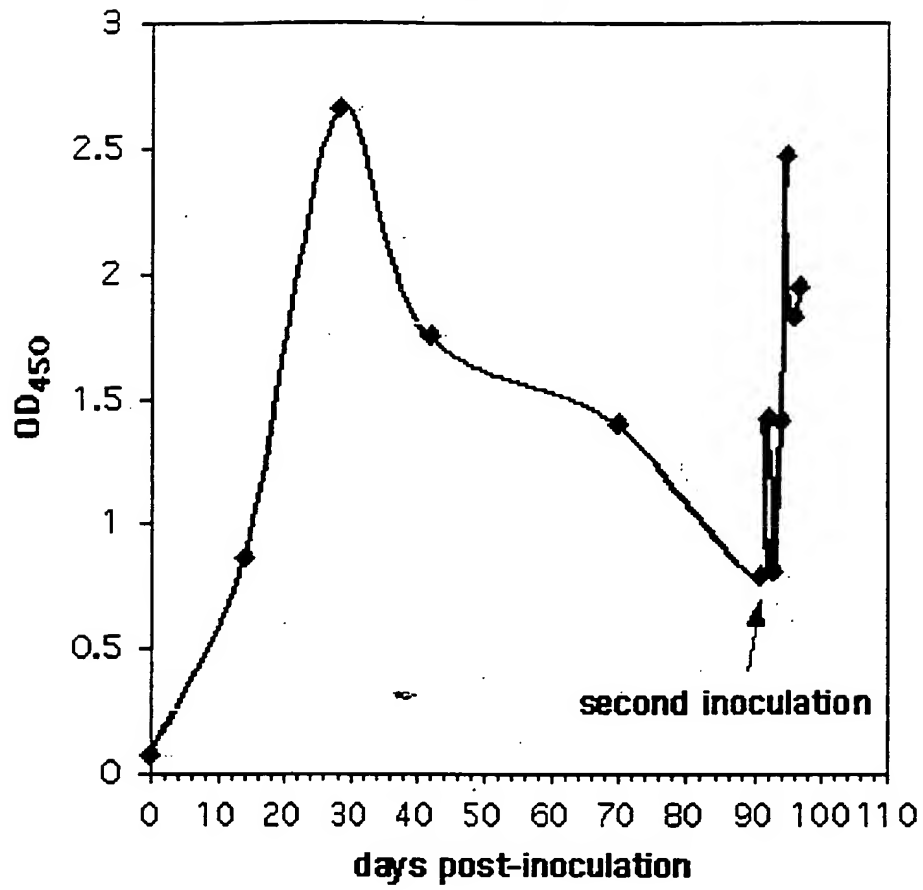


FIGURE 11A

Anti-HBcAg relative titer
(Group 4)

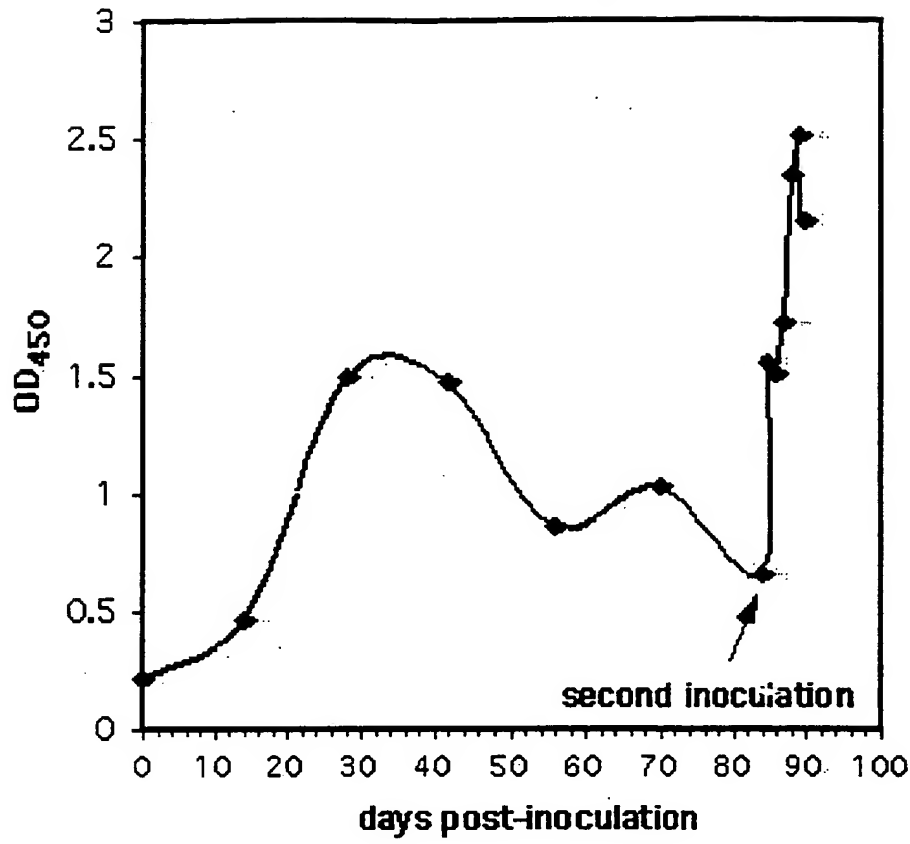


FIGURE 11B

FIGURE 12

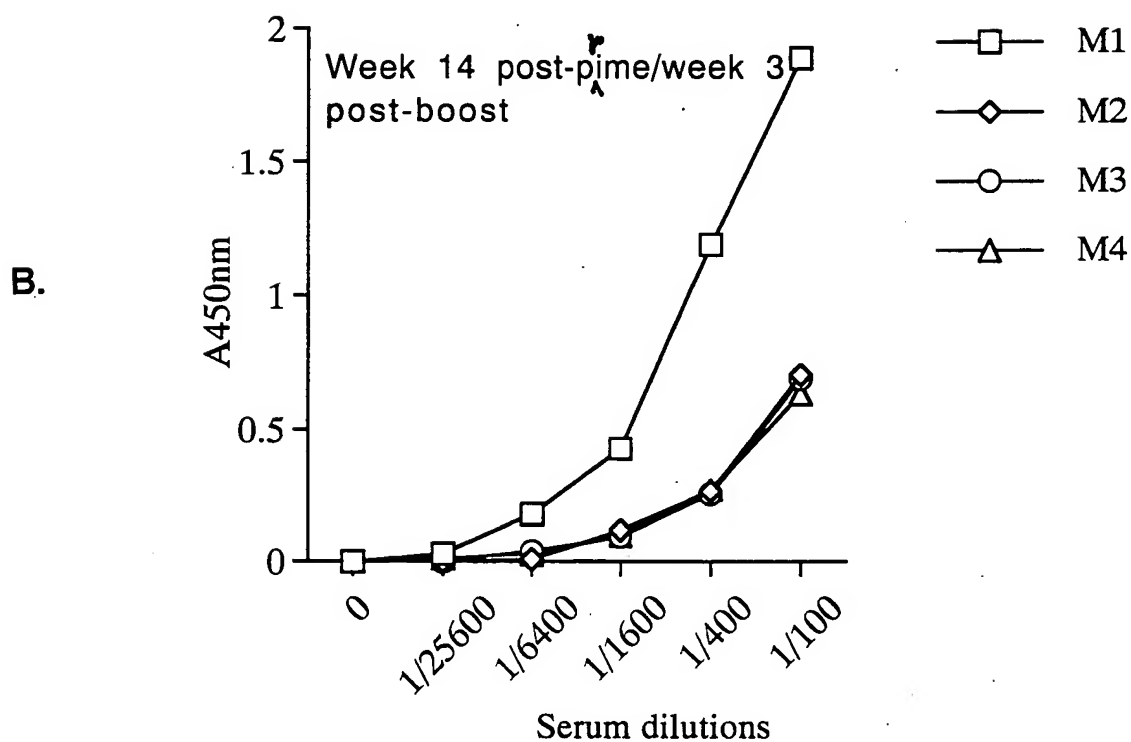
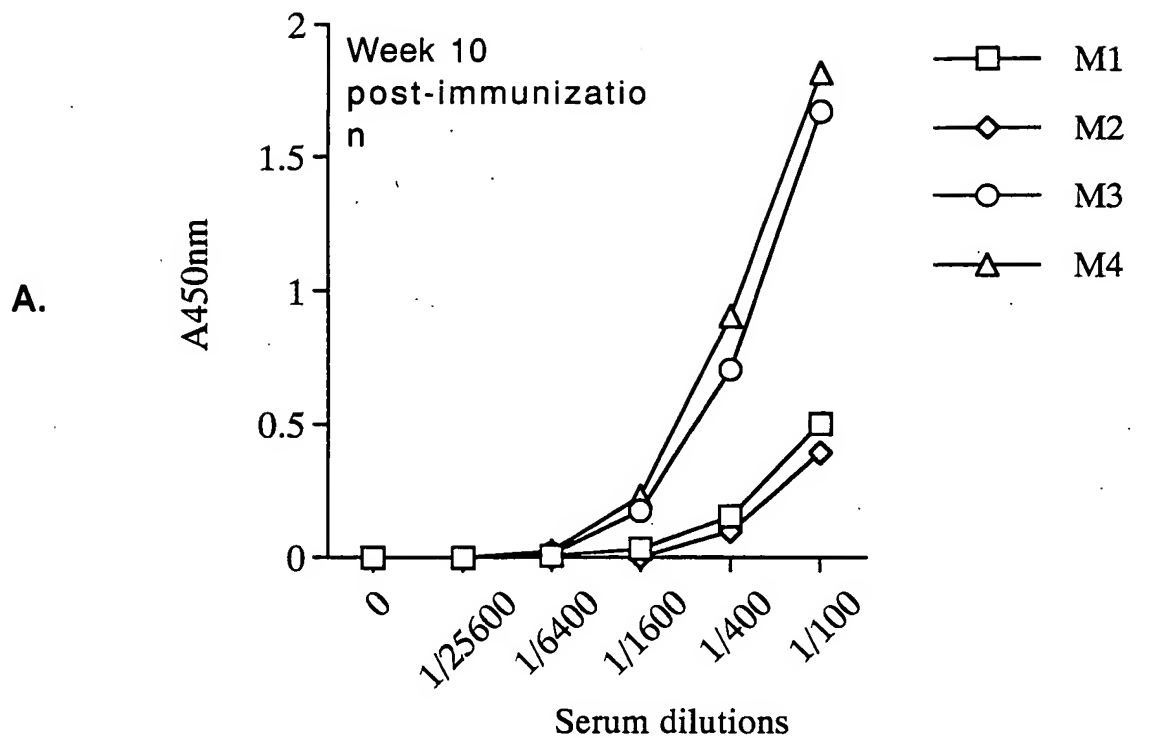


FIGURE 13

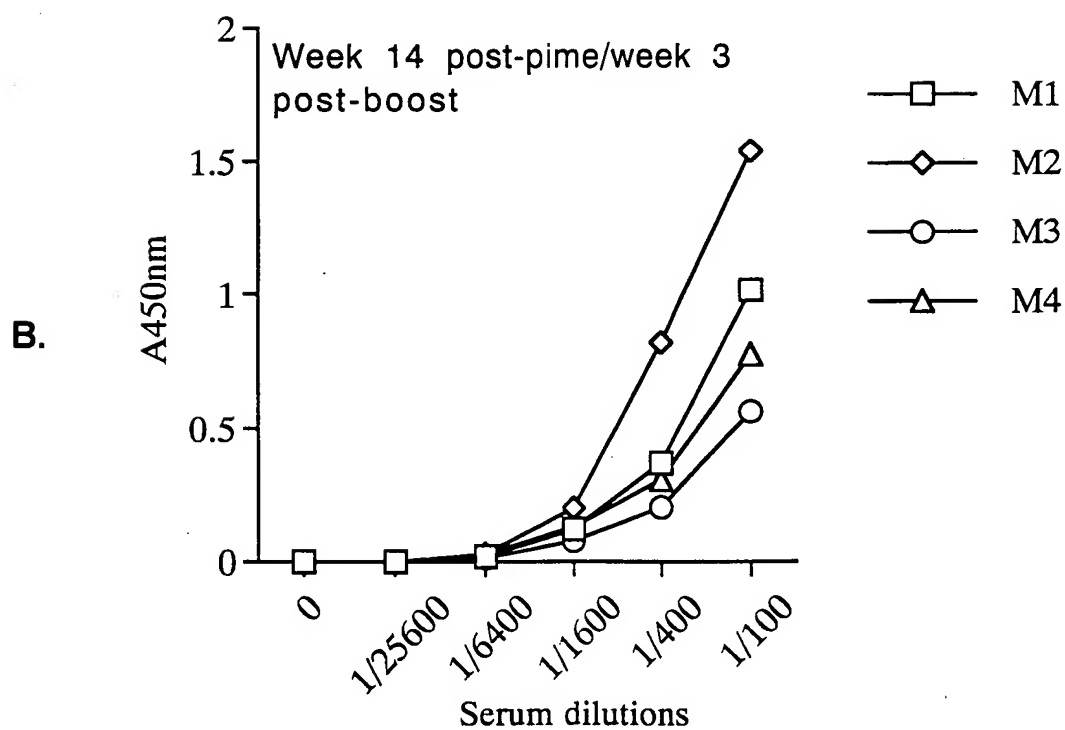
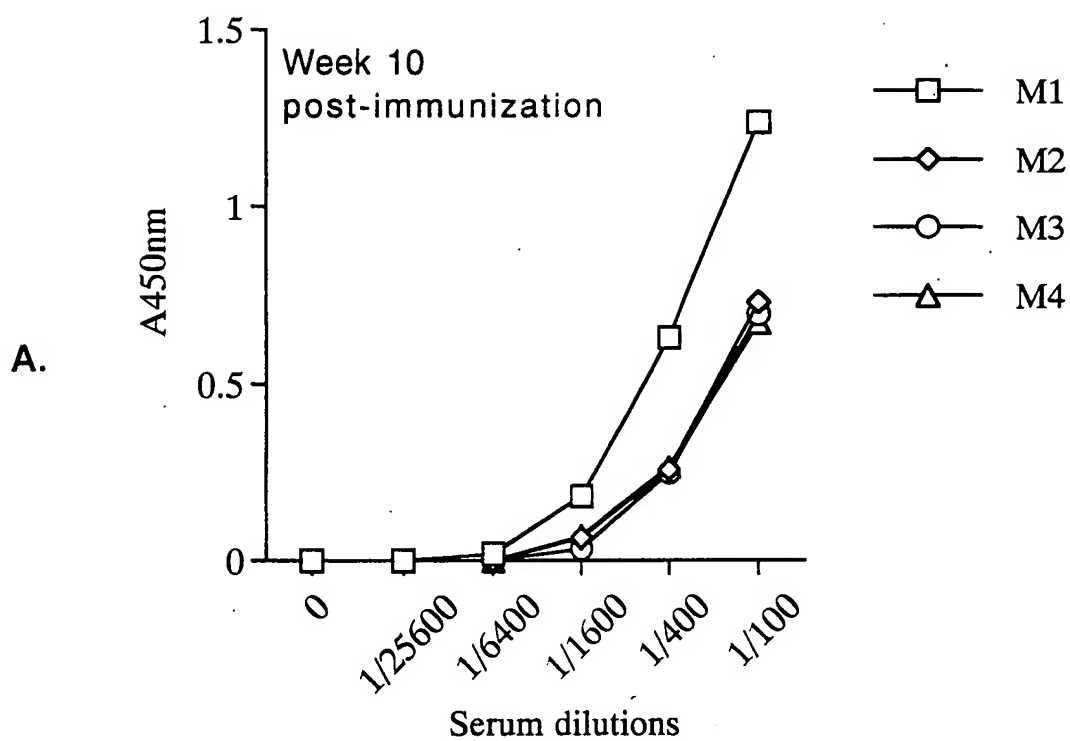
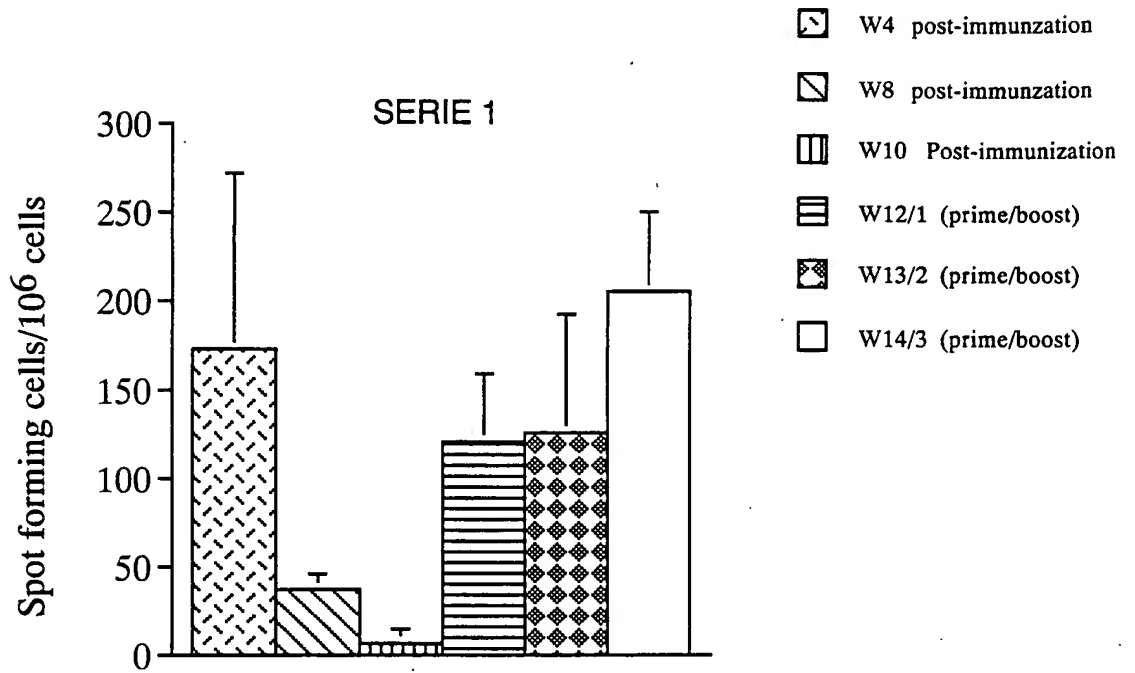


FIGURE 14

Gag-specific IFN γ secreting splenic cells
after immunization of mice with Ad(3C,
Gag, Env)

A.



B.

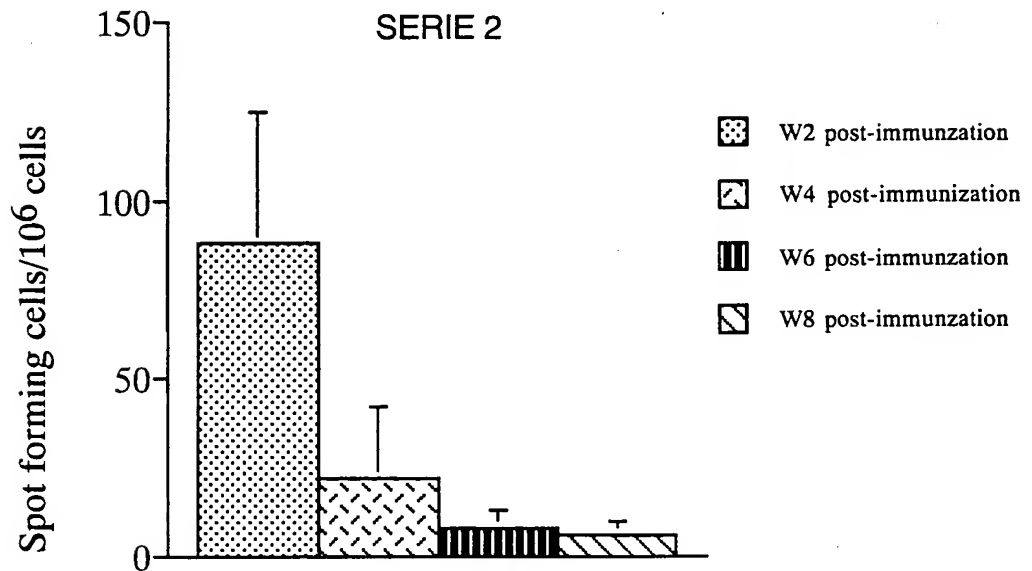
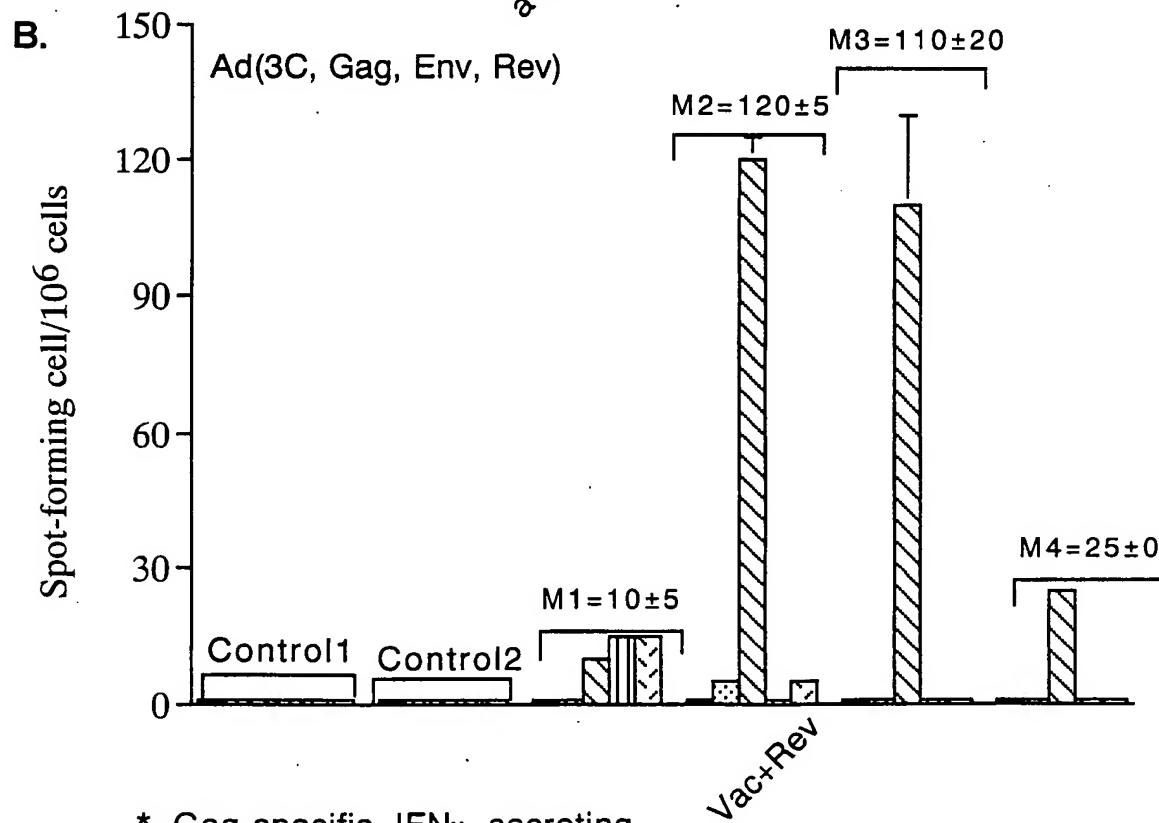
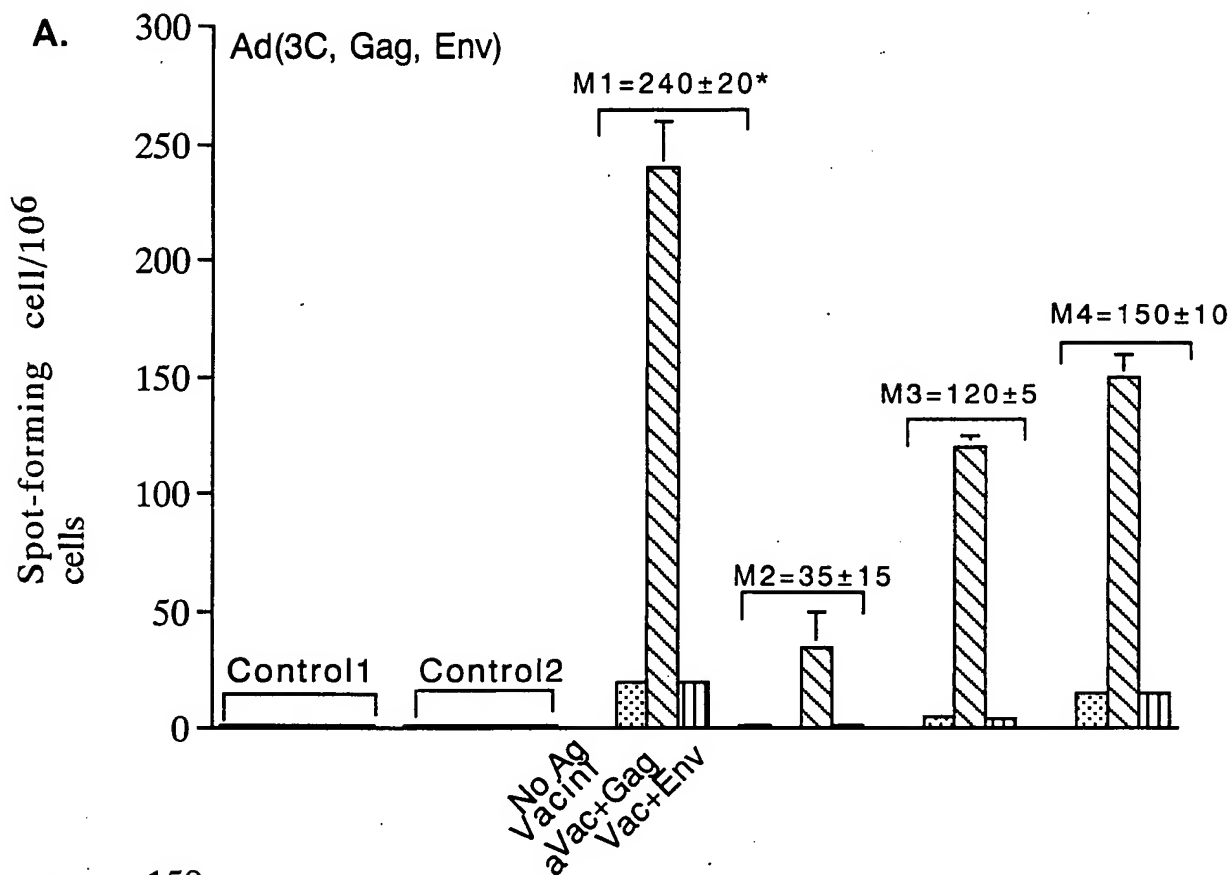


FIGURE 15

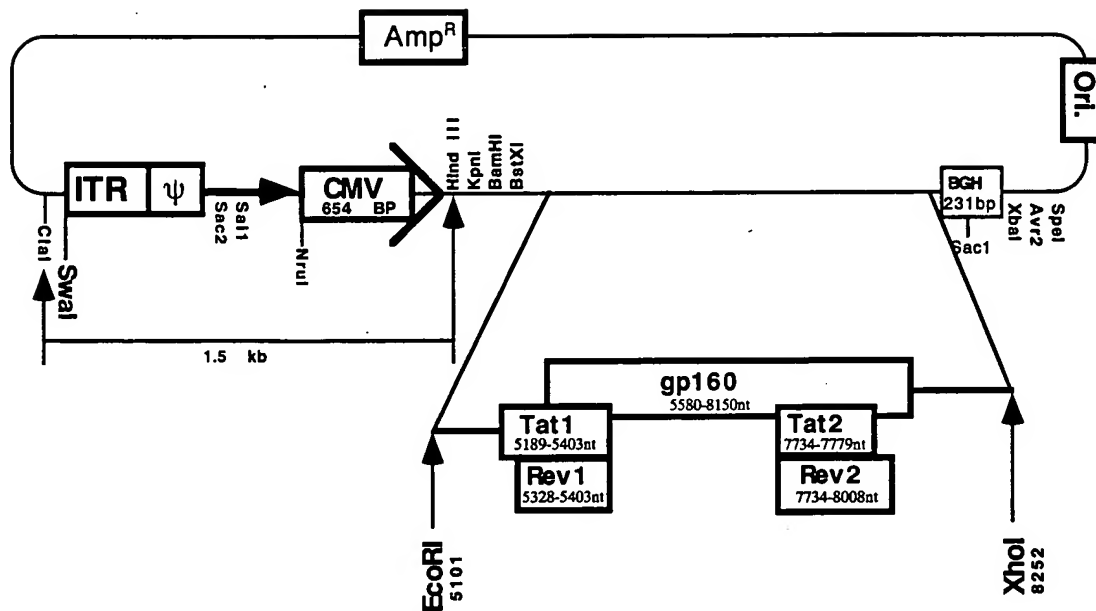
L23: ELISPOT for IFN γ secretion: Serie1 spleen cells
from mice at week W13/2 (post-prime/boost)



* Gag-specific IFN γ secreting

FIGURE 16 Ad-E.T.R/IL2 (from BH10 strain)

A. pLAd-E.T.R



B. pRAd.ORF6-IL2

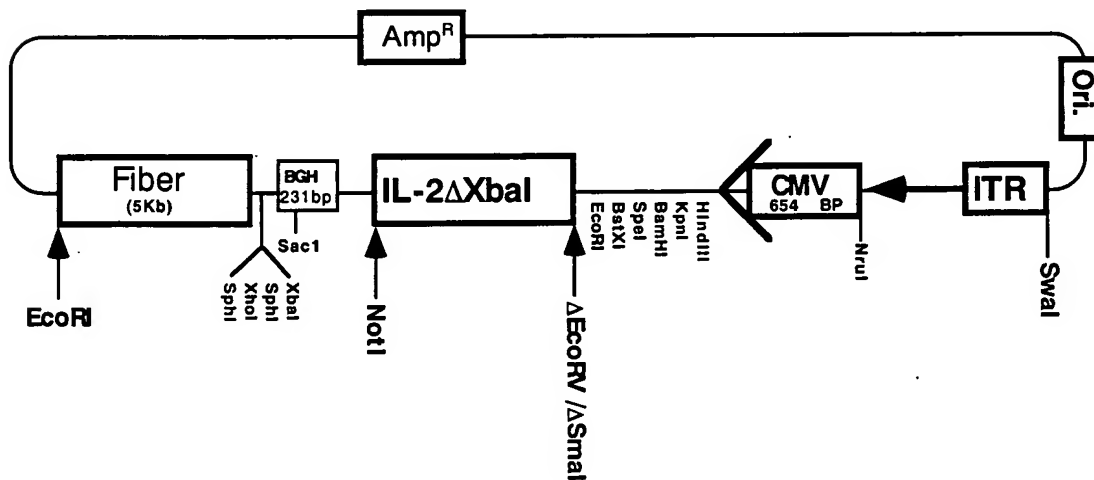
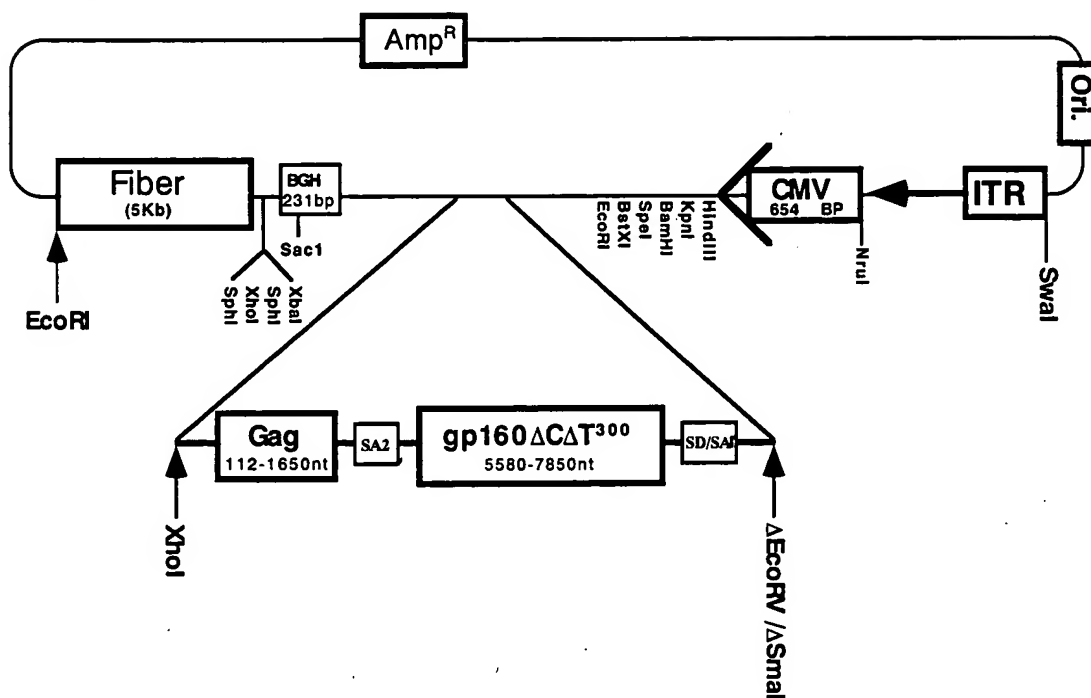


FIGURE 17 Ad-3C/E^mΔCΔT³⁰⁰-G (from BH10 strain)

A. pRAd.ORF6-E^mΔCΔT³⁰⁰-G



B. pLAd-3C

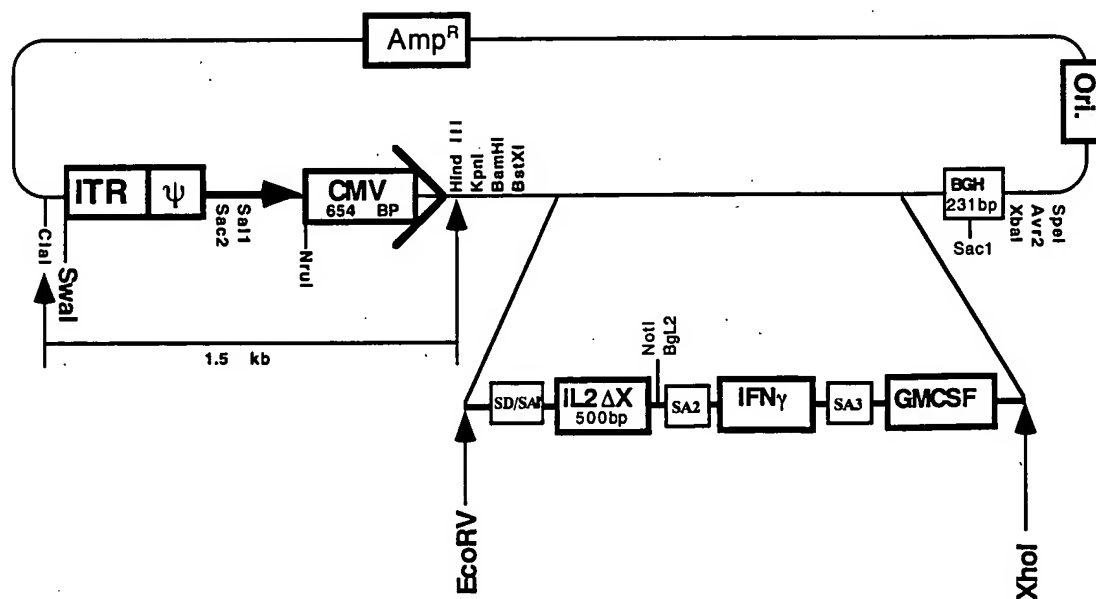
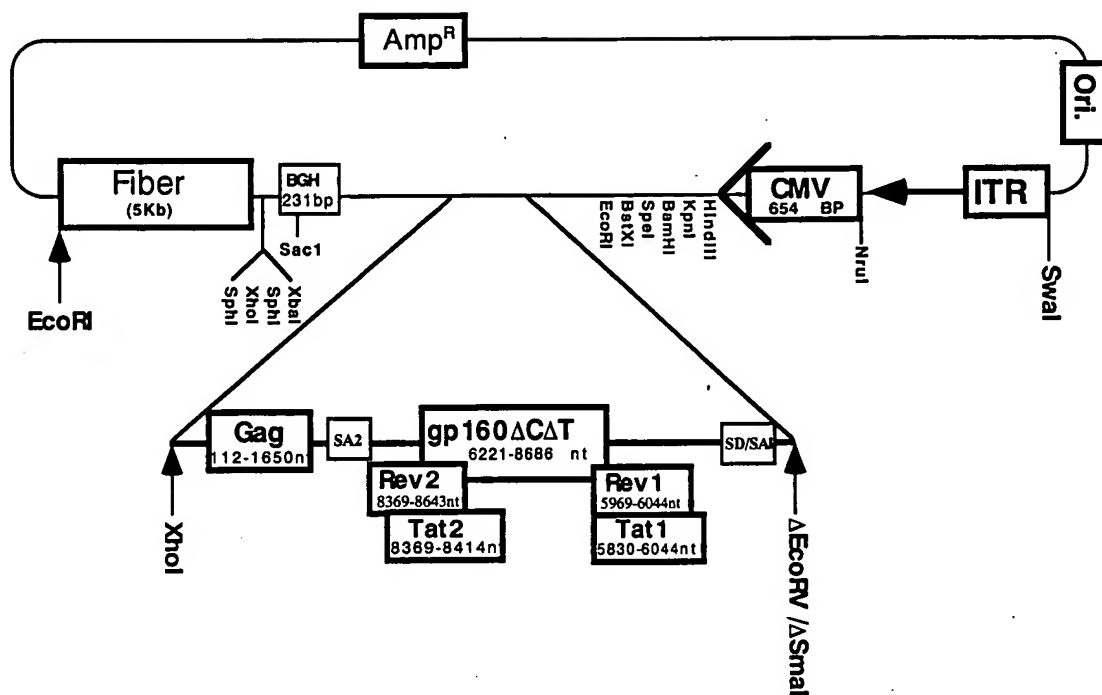


FIGURE 18

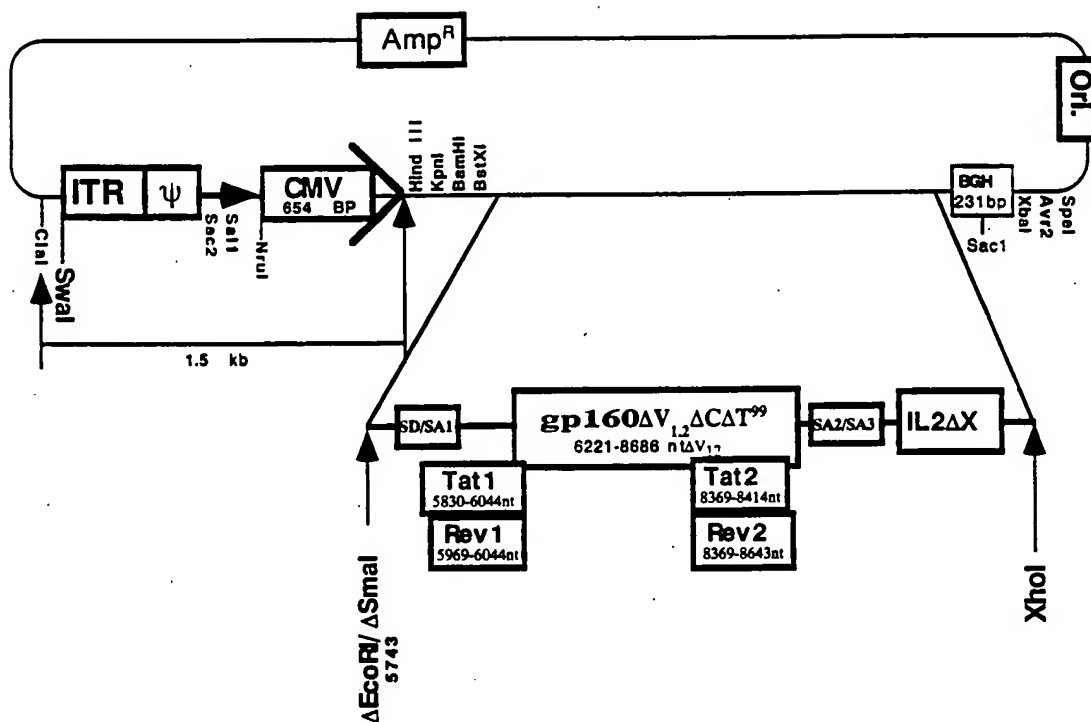
pRad.ORF6-E^mΔCΔT⁹⁹.T.R-G



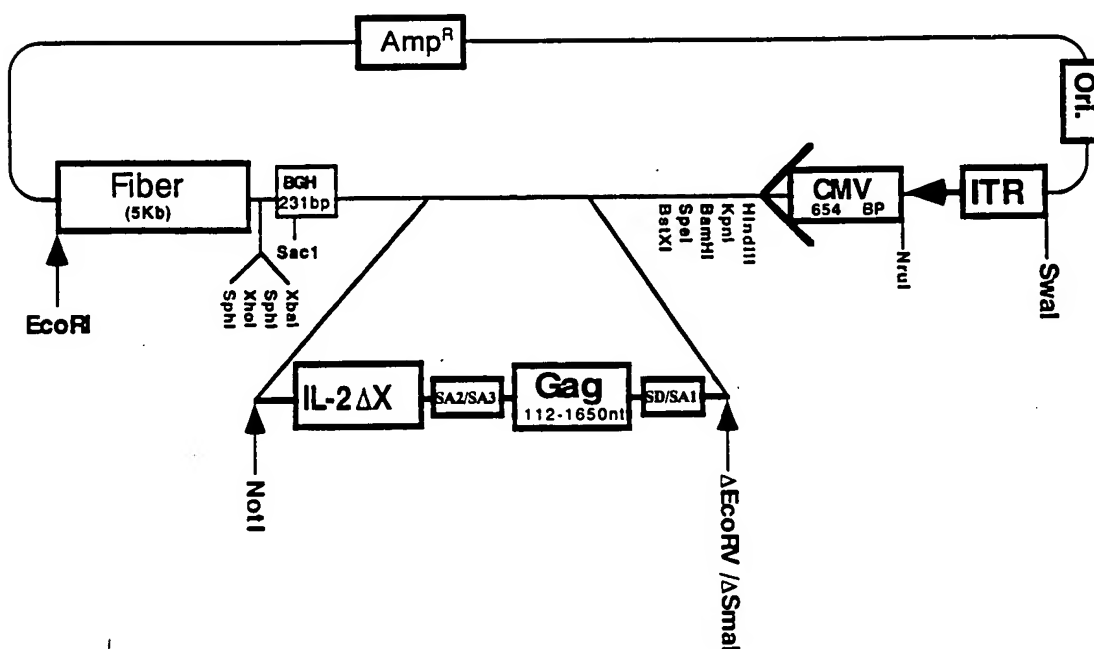
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FIGURE 19

A. pLAd-E^mΔV_{1,2}ΔCAT.T.R-IL2



B. pRAd.ORF6-G.IL2



10003035-110101

FIGURE 20

pLAd-ETRN

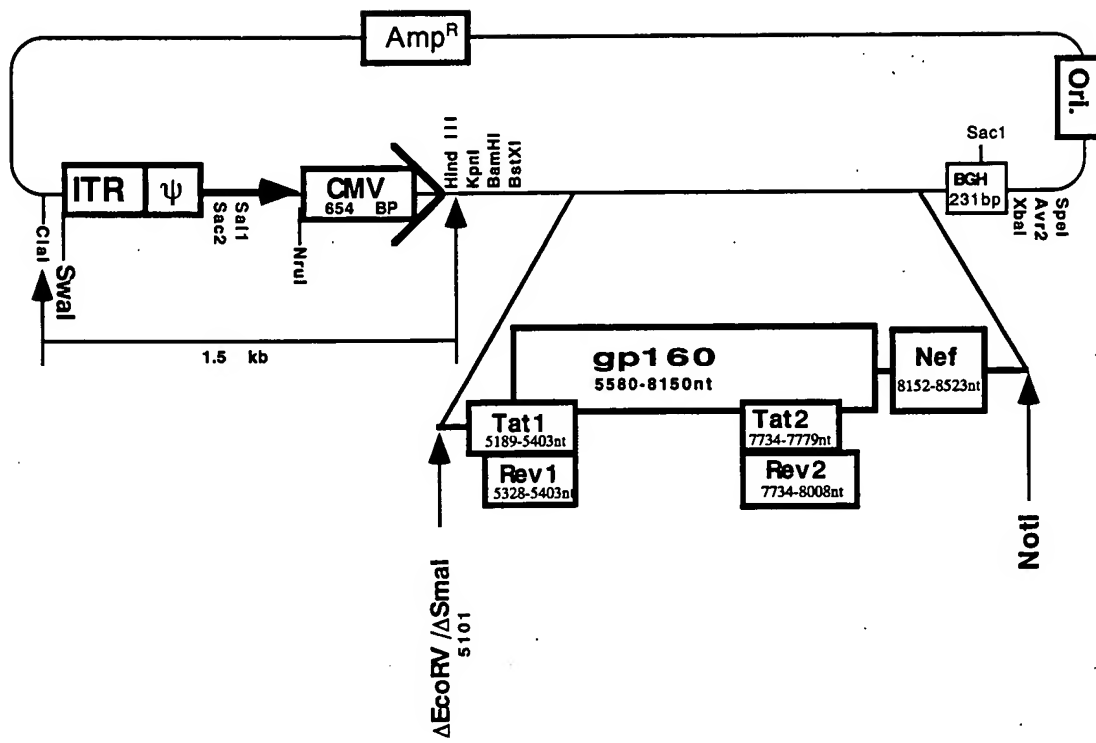


FIGURE 21

pLAd-E^mΔC.N

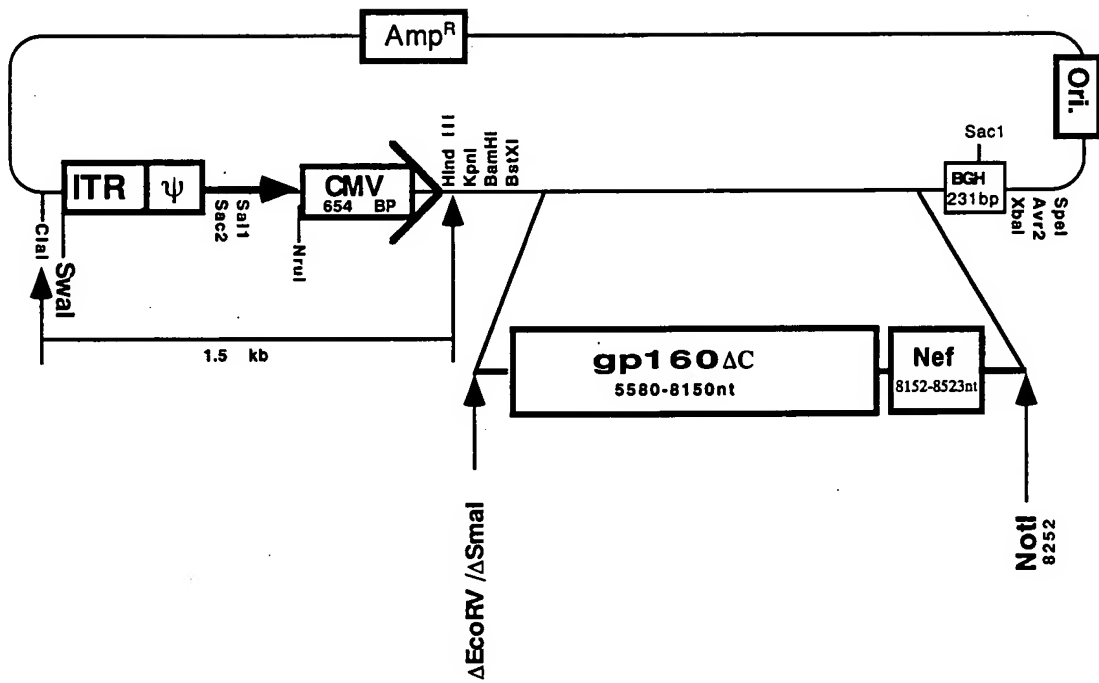


FIGURE 22

pLAd-E^ΔΔCAT³⁰⁰.T

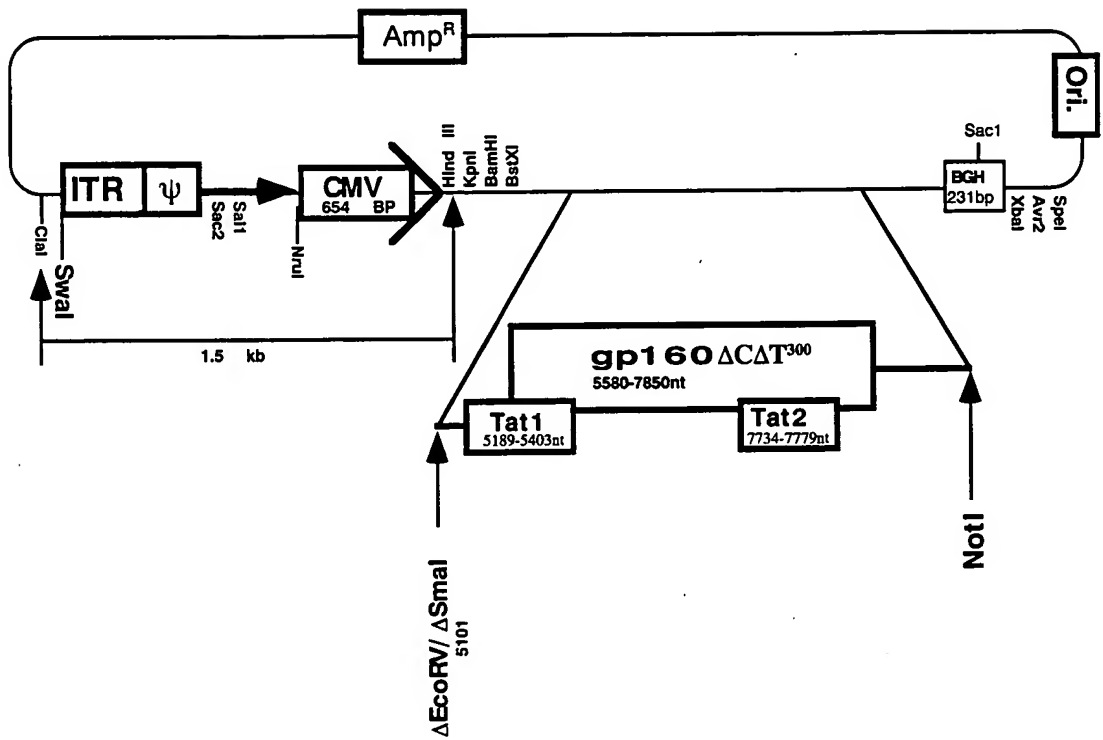
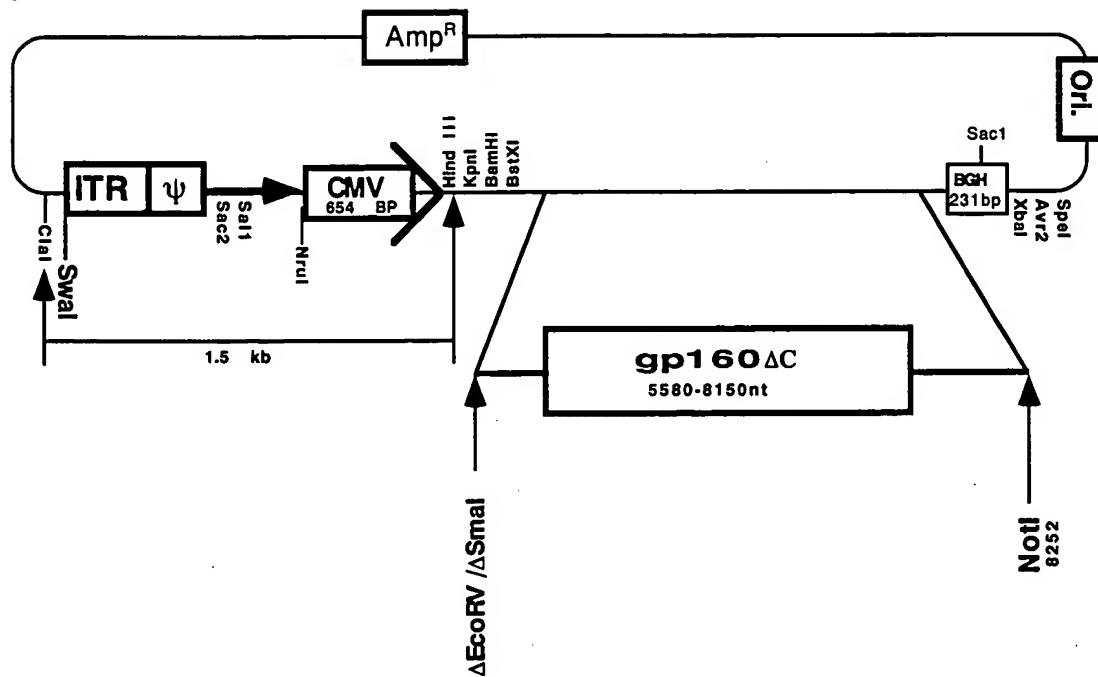


FIGURE 23

A. pLAd-E^mΔC



B. pRAd.ORF6-E^mΔC

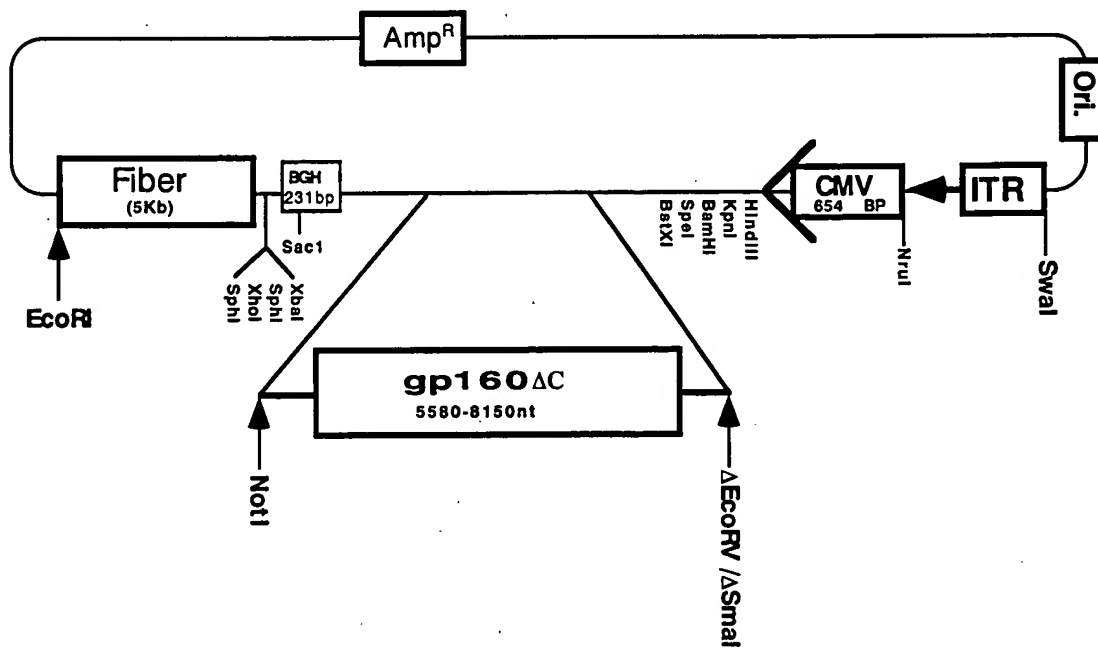
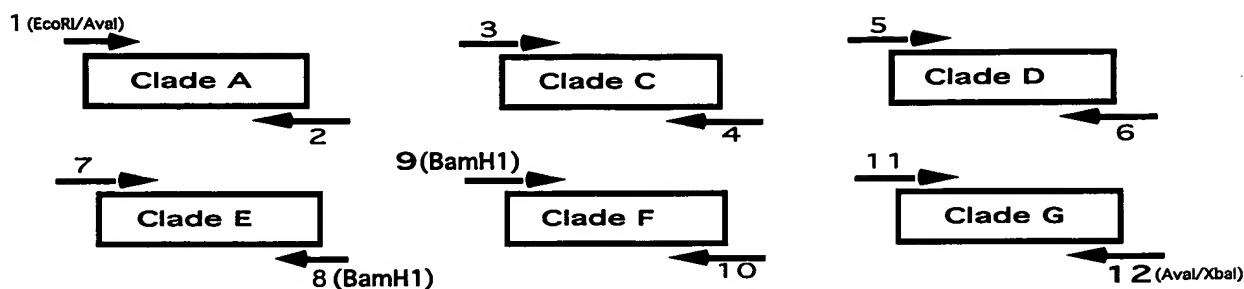
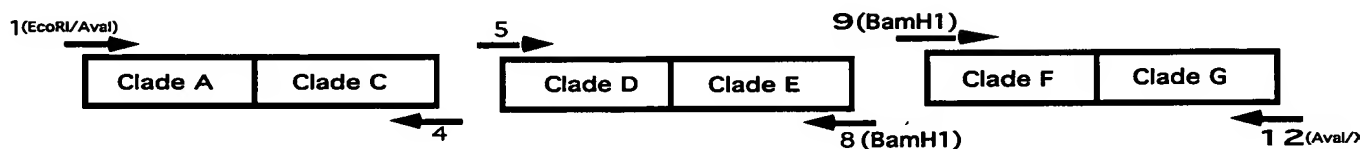


FIGURE 24

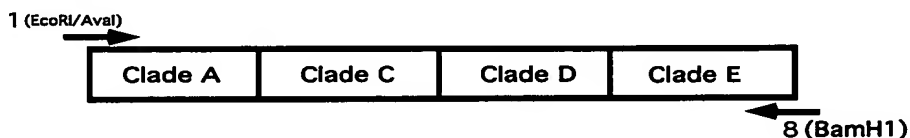
Step 1. Amplification of each individual clone A-G



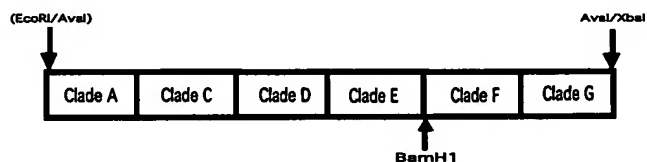
Step 2. Amplification of every two Clones AC, DE, FG



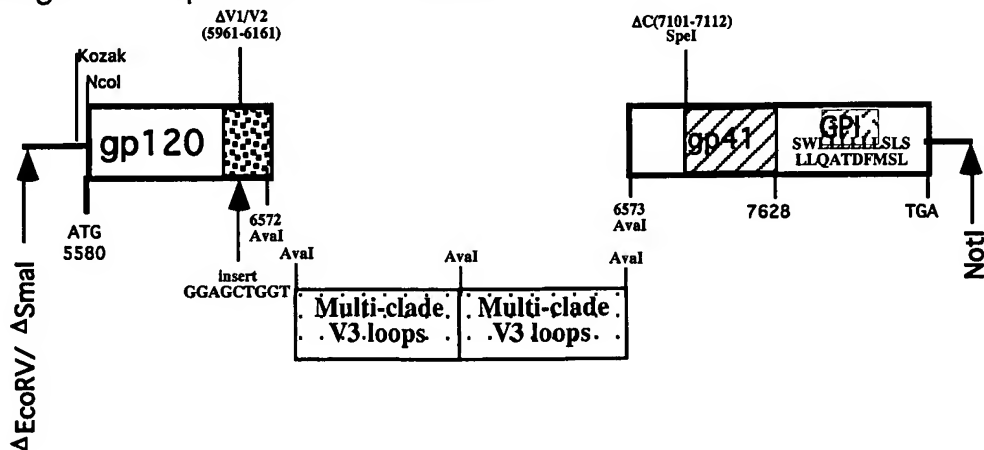
Step 3. Amplification of Clones ACDE



Step 4. Cloning the multi-clades into pSP73 vector



Step 5. Generating of a duplicated multi-clades



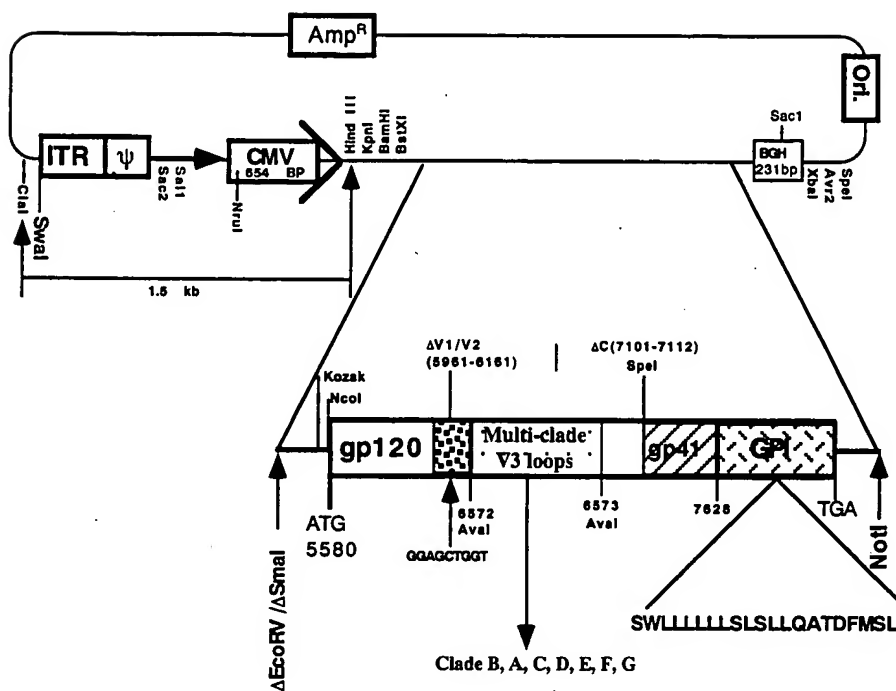
[illegible][illegible]

FIGURE 26

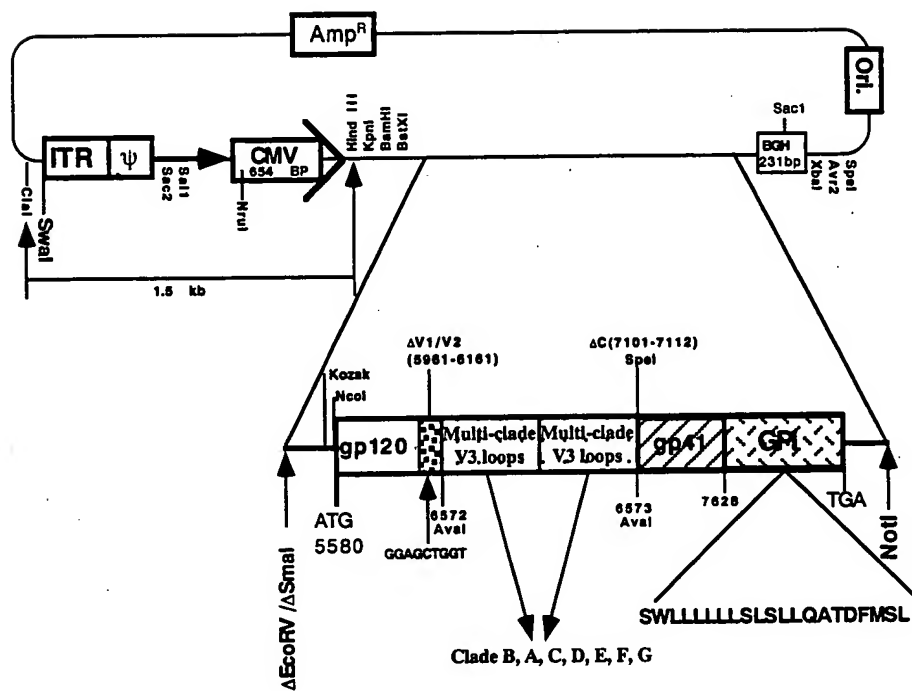
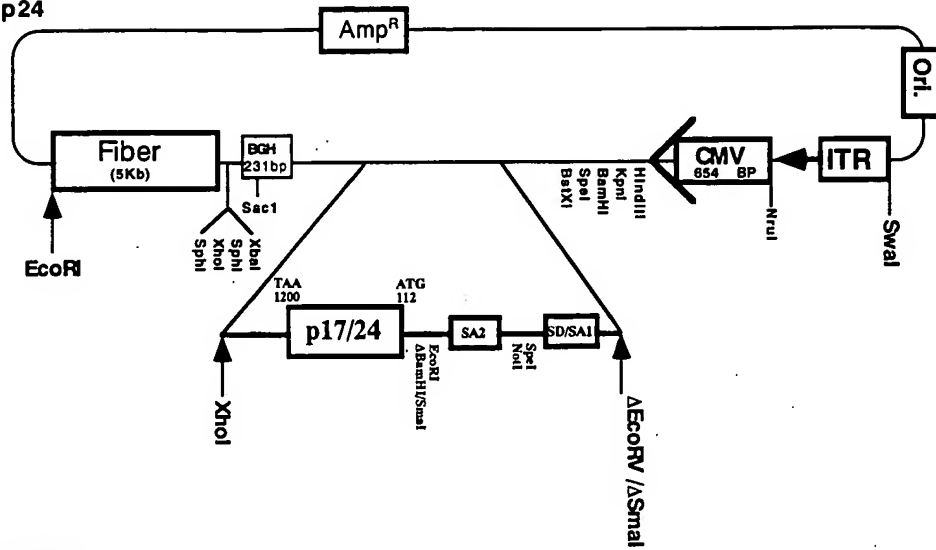
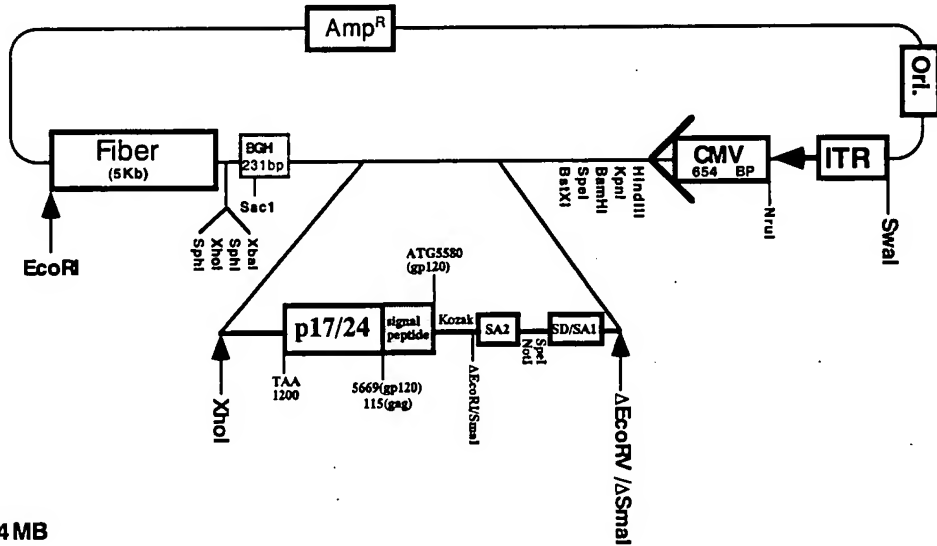


FIGURE 27

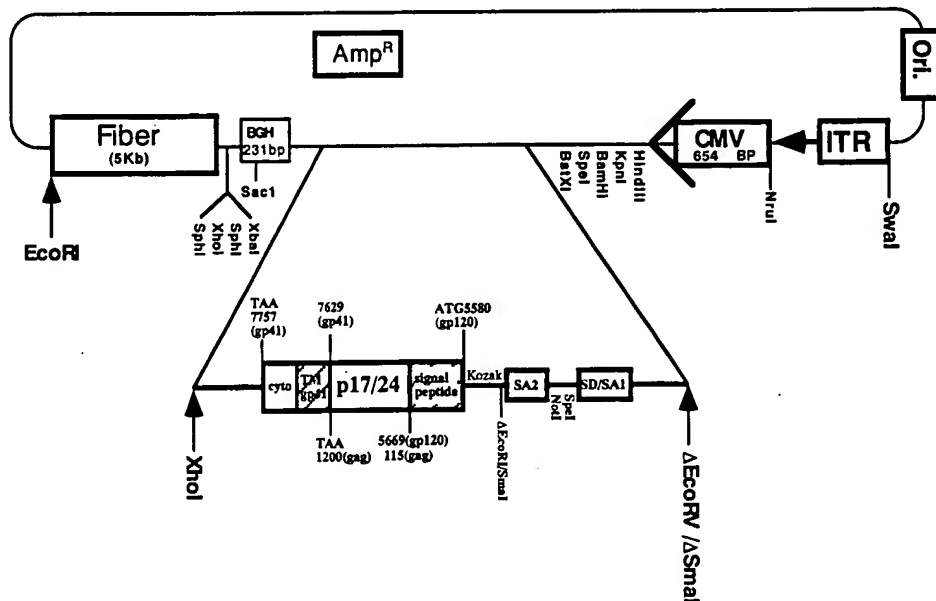
A. pRA_D.ORF6-p17/p24



B. pRA_D.ORF6-p17/24sec



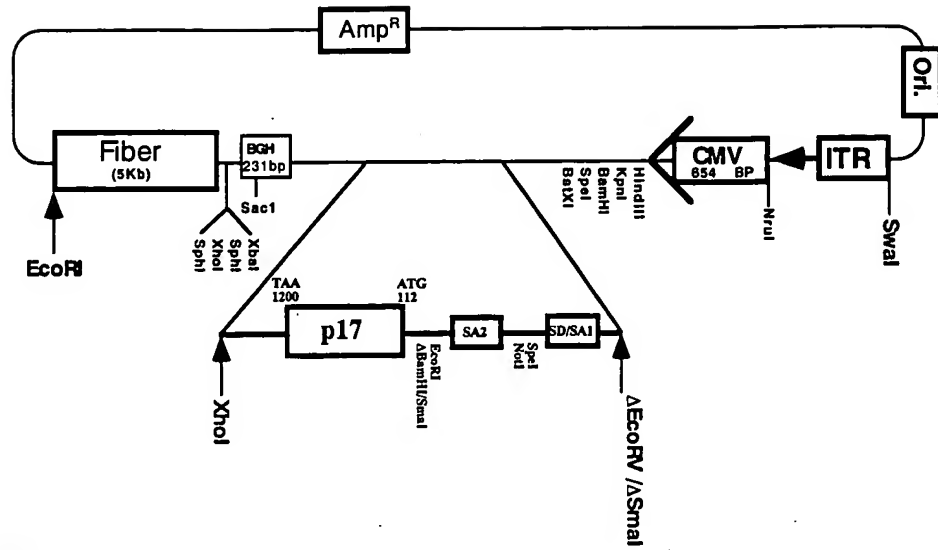
C. pRA_D.ORF6-p17/24MB



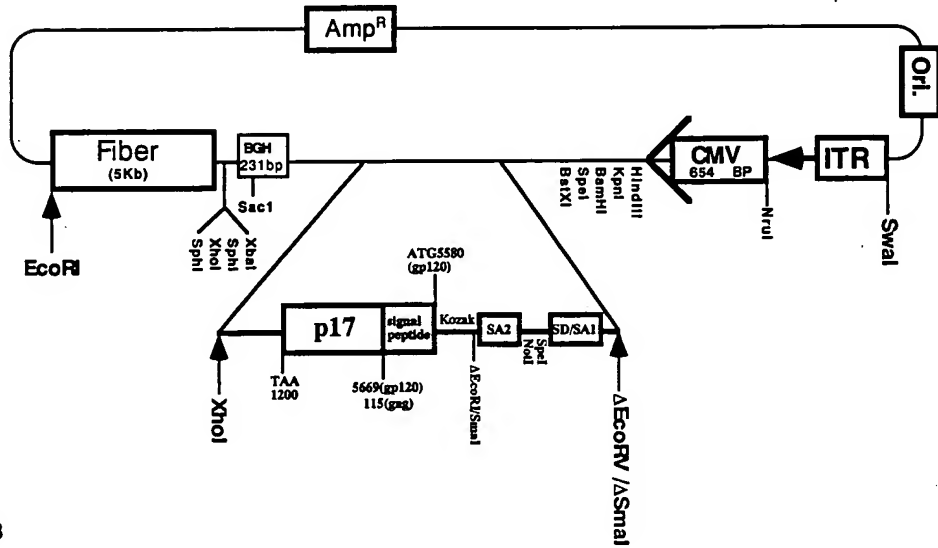
1003035-110101

FIGURE 28

A. pRAAd.ORF6-p17



B. pRAAd.ORF6-p17sec



C. pRAAd.ORF6-p17MB

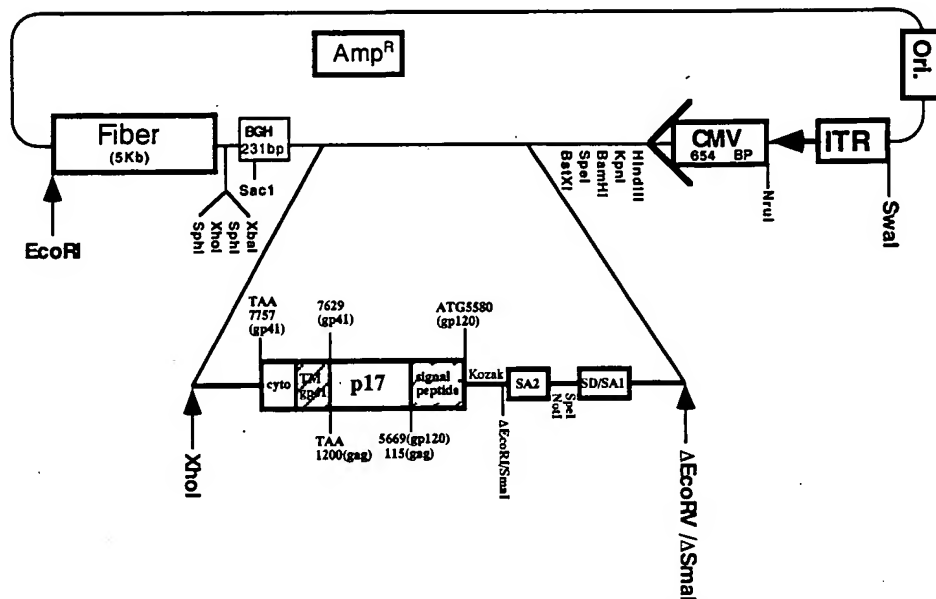
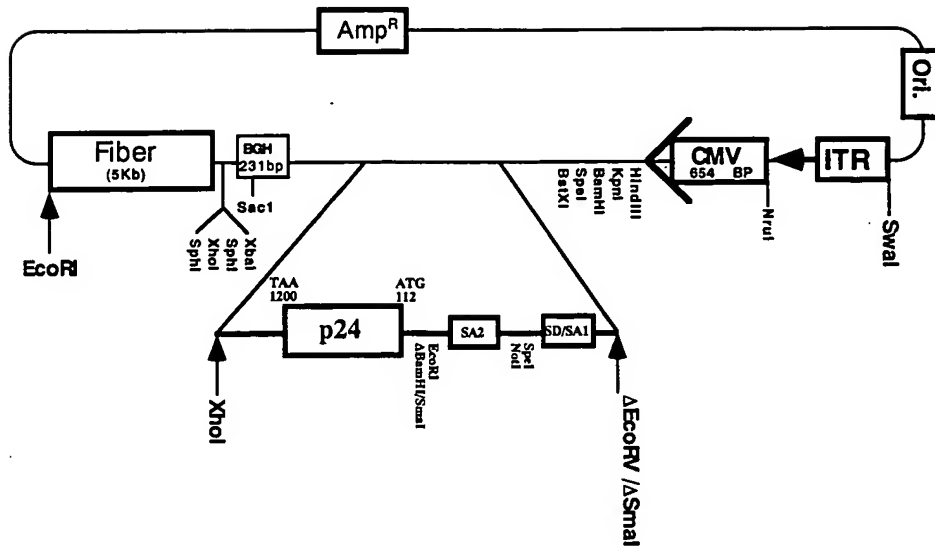
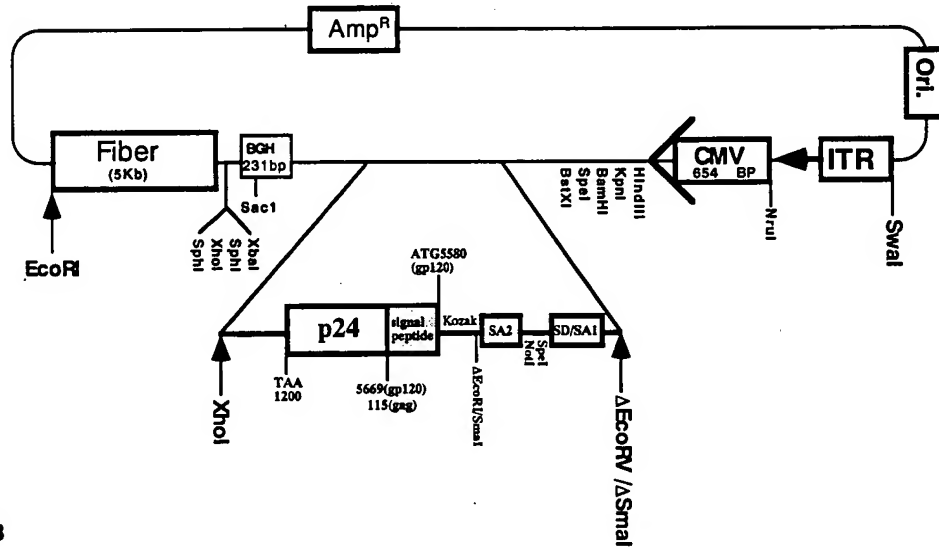


FIGURE 29

A. pRad.ORF6-p24



B. pRad.ORF6-p24sec



C. pRad.ORF6-p24 MB

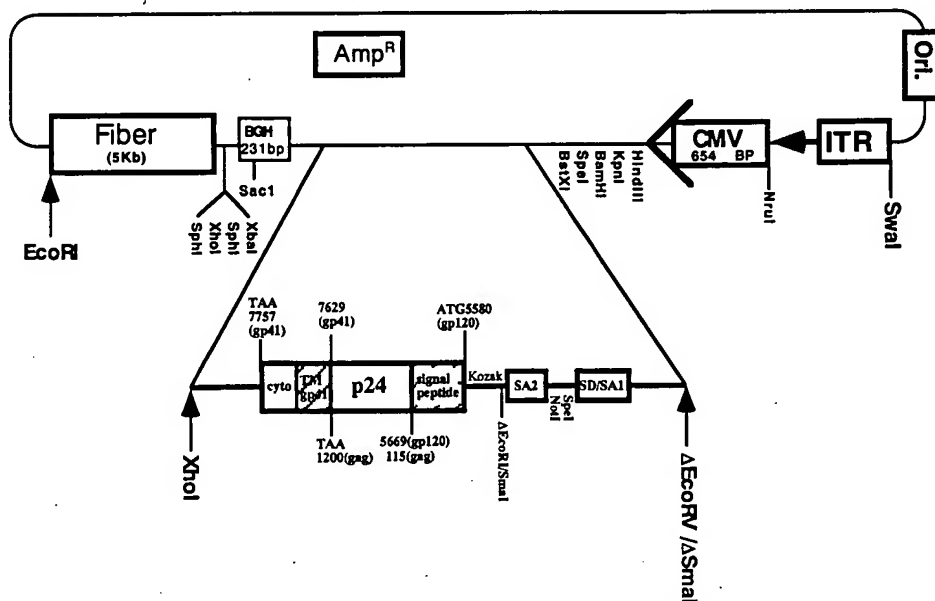


FIGURE 30 Adenoviral construct of Ad-E^m.V3^m/p17/24MB

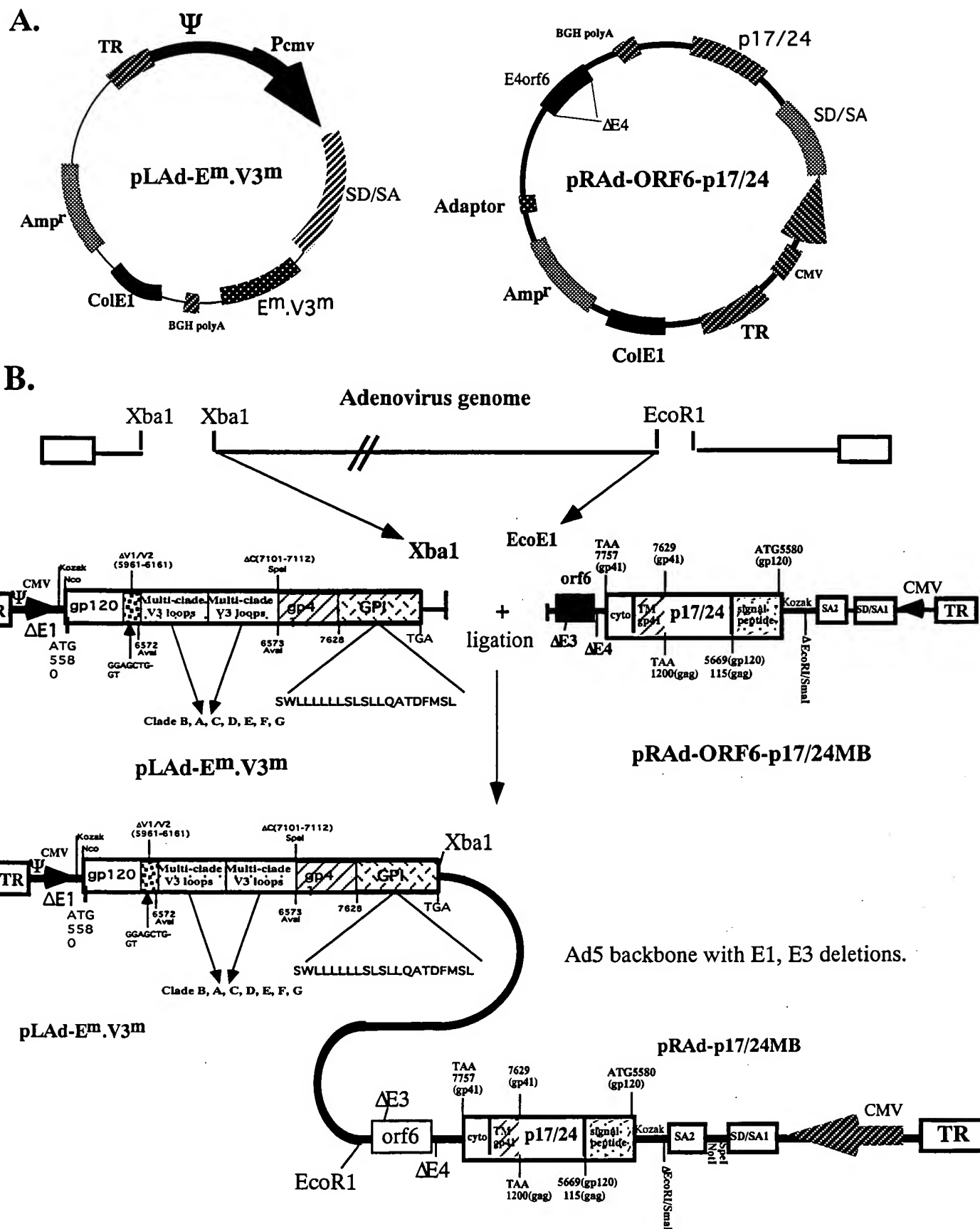


FIGURE 31 Adenoviral construct of Ad-E^m.V3^m/p17MB

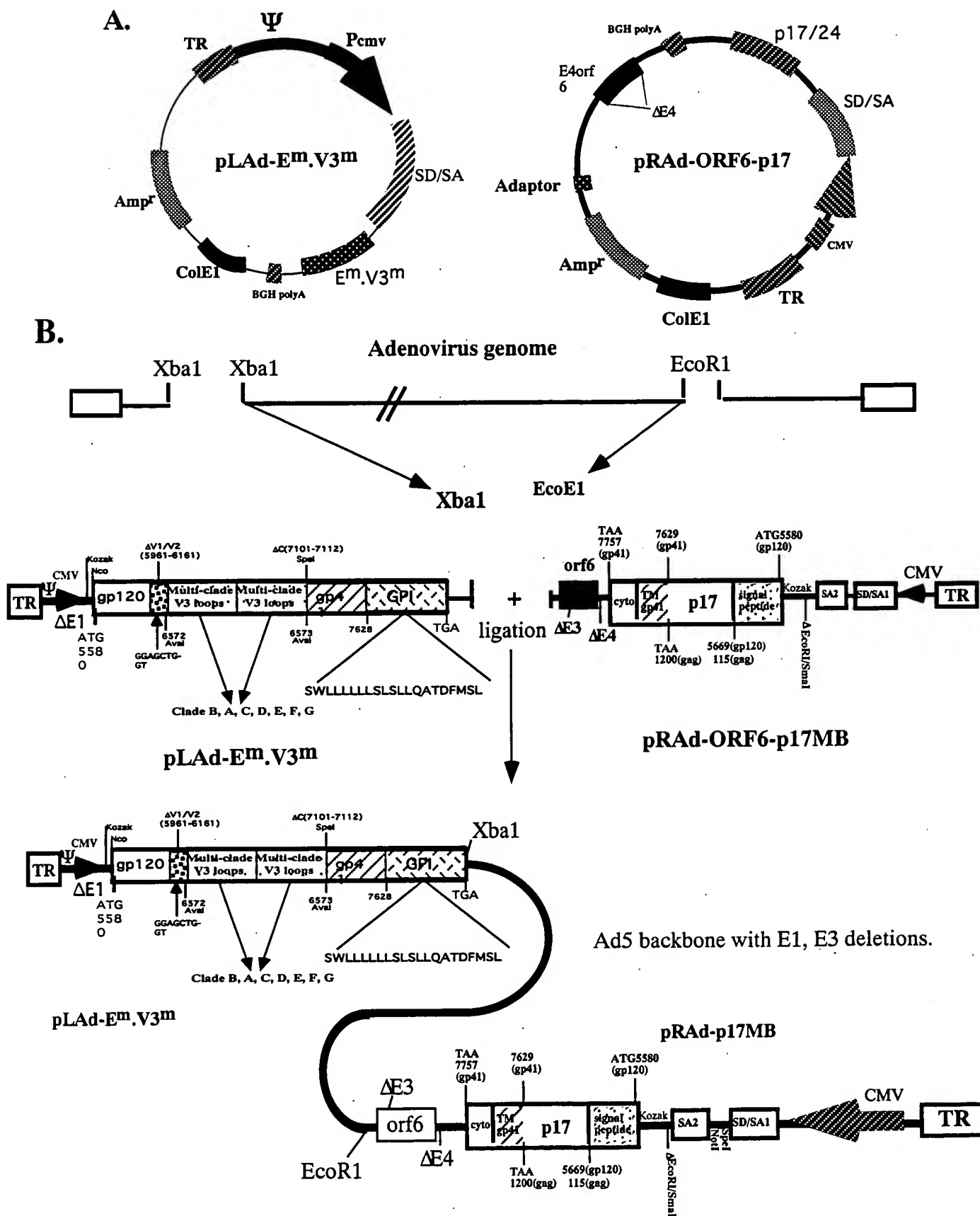


FIGURE 32 Adenoviral construct of Ad-E^m.V3^m/p24MB

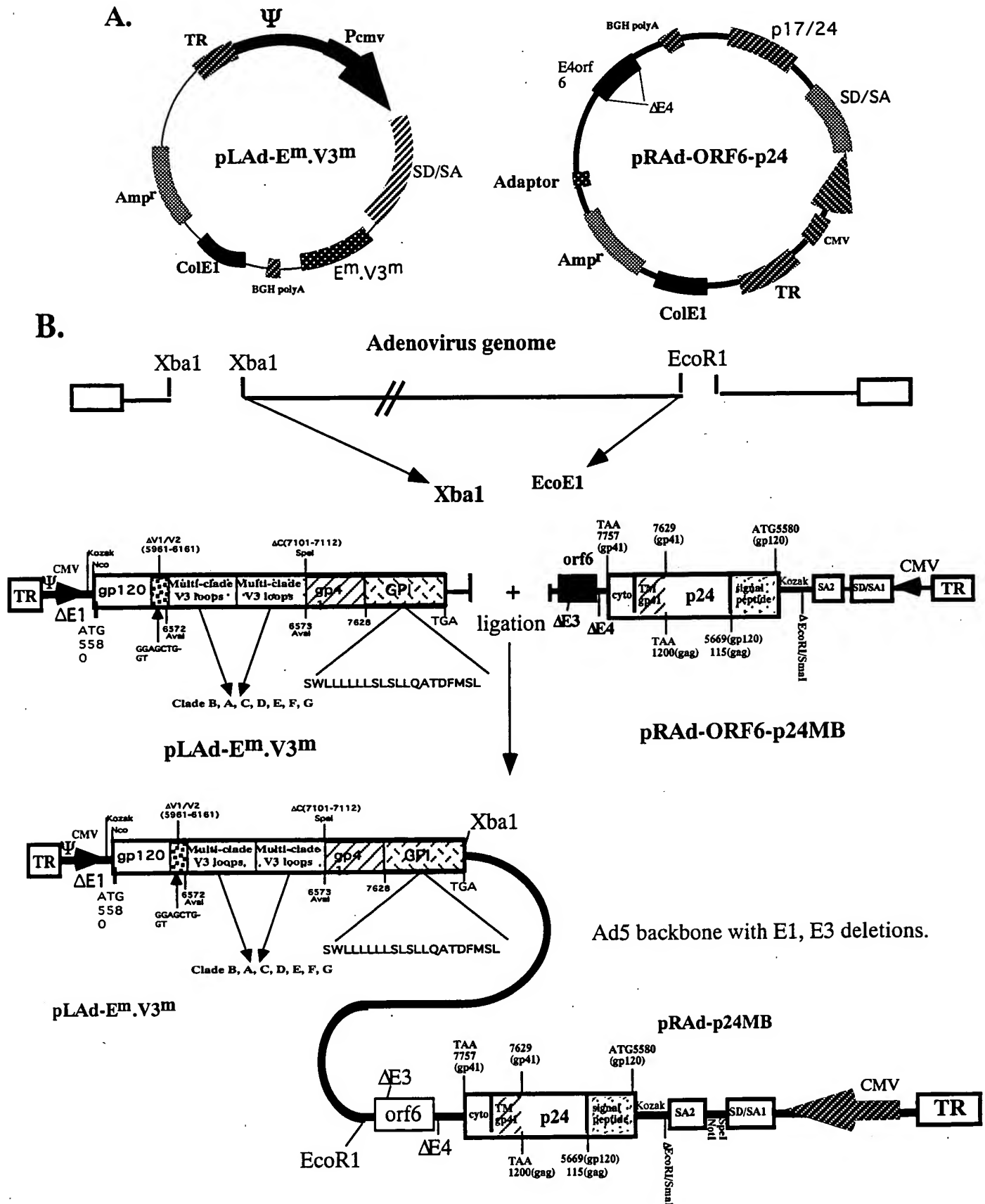
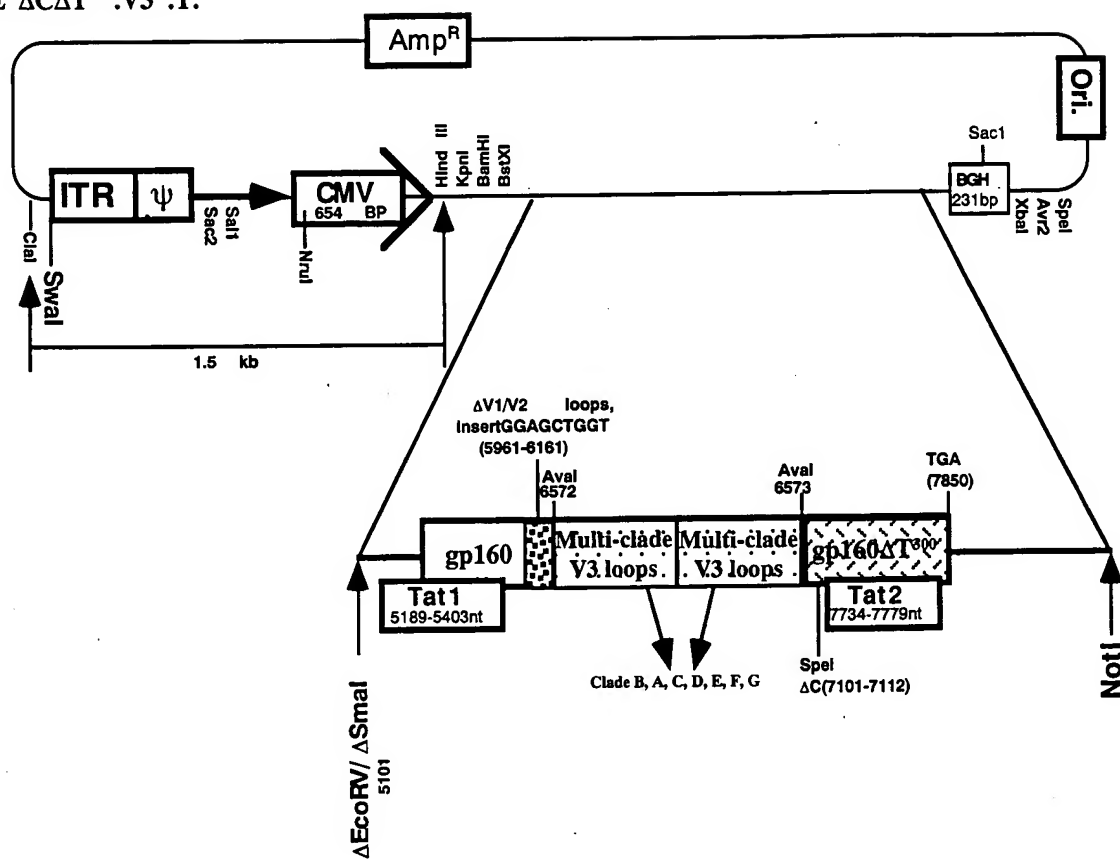


FIGURE 33

pLAd-E^ΔCDT³⁰⁰.V3^Δ.T.



pRAAd.ORF6-G.PI

FIGURE 35

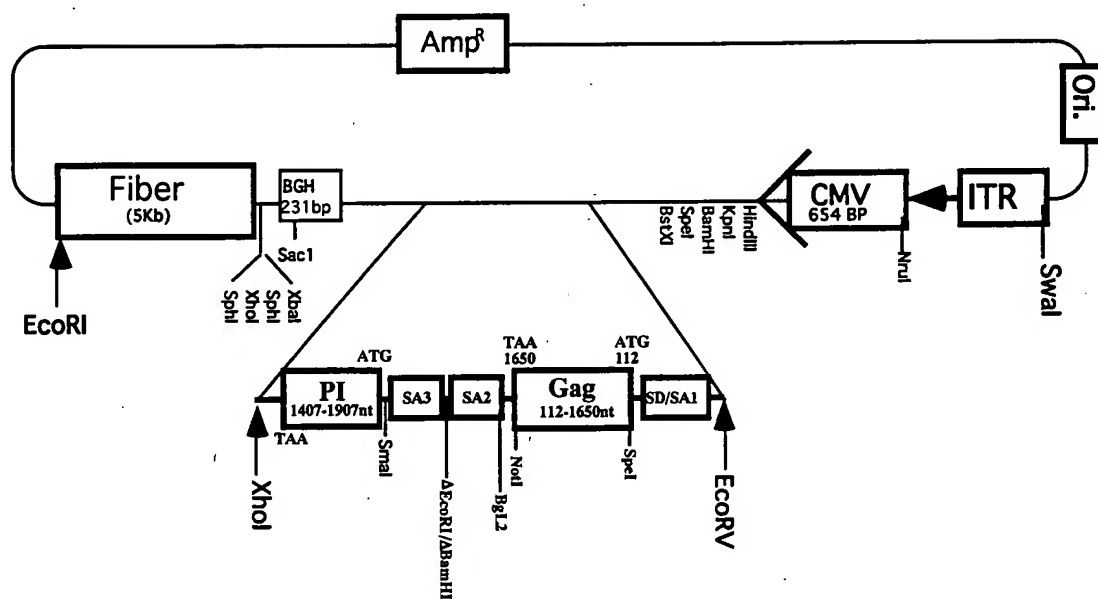


FIGURE 36

pRAAd.ORF6-G-PI

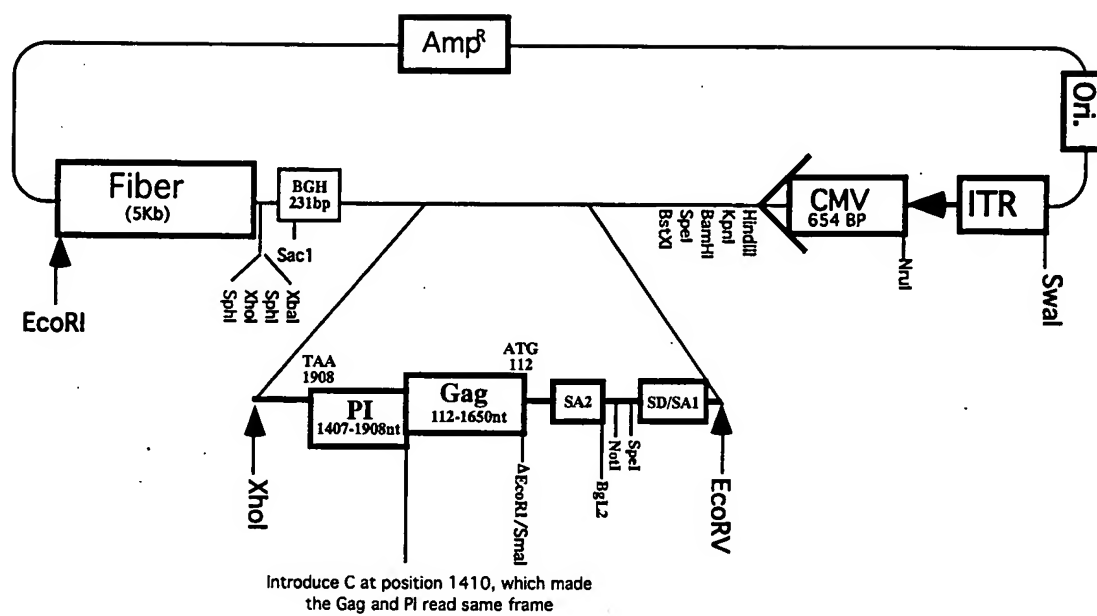


FIGURE 37

SD/SA1.2.3 vector

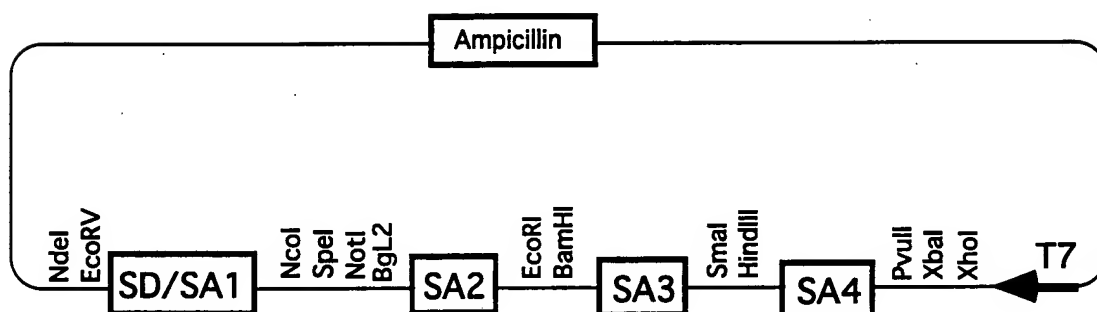


FIGURE 38

DNA Sequence of Env/Tat/Rev from BH10 clone [SEQ ID NO: 14]:

Gaattctgcaacaactgctgtttatccattttcagaattgggtgtcgacat
EcoRI

agcagaataggcggttactcgacagaggagagcaagaaatggagccagtagatcctagactagagccctgga
agcatccaggaagtgcgcctaaaactgcttgtaccaattgctattgtaaaaagtgttgctttcattgcca
gtttgtttcatacaaaaagccttaggcattctcctatggcaggaagaagcggagacagcgacgaagacctcc
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tagcaatagtagcatttagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatat
aggaaaatattaagacaaagaaaaatagacagggttaattgatagactaatagaaagagcagaagacagtg
caatgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatggggcaccatgctccttggg
atgttgatgatctgtagtgtacagaaaaattgtgggtcacagtctattatggggtacctgtgtggaagga
agcaaccaccactctattttgtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggcca
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gggacgatctgcggagcctgtgcctcttcagctaccaccgcttgagagacttactcttgattgtaacgagg
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tcaggagctaaagaatagtgtctgttagcttgcctcaatgccacagctatagcagtagctgaggggacagata
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gaaaggattttgctataagatgggtggcaagtgggtcaaaaagtgtgtggtggatggcctgctgtaaggg
aaagaatgagacgagctgagccagcagcagatgggggtgggagcagcatctcgag

XhoI

FIGURE 39

DNA Sequence of IL-2ΔX [SEQ ID NO: 15]:

Tcactctctttaatcactactcacagtaacctcaactcctgccacaatgta
caggatgcaactcctgtcttgcatcactaagtcttgcaactgtcacaaa
cagtgcacctacttcaagttctacaaagaaaacacagctacaactggagca
tttactgctggatttacagatgattttgaatggaattaataattacaagaa
tcccaaactcaccaggatgctcacatttaagttttacatgccaagaaggc
cacagaactgaaacatcttcagtgtcttgaagaagaactcaaacctctgga

ΔXbaI (cta → ctt)

ggaagtgctaaattagctcaaagcaaaaactttcacttaagacccagggga
cttaatcagcaatatcaacgtaatagttctggaactaaagggatctgaaac
aacattcatgtgtgaatatgctgatgagacagcaaccattgtagaatttct
gaacagatggattaccttttgtcaaagcatcatctcaacactaacttga

FIGURE 40

DNA Sequence of Env^mΔCΔT³⁰⁰ (HIV strain BH10) [SEQ ID NO: 16]:

Gaattcg**ccac**cat**ggg**gagtgaaggagaaatatcagcacttgtggagatg

EcoRI Kozak NcoI

ggggtggagatggggcaccatgctccttgggatgttgatgatctgtagtgctacagaaaa
ttgtgggtcacagtctattatggggtacctgtgtggaaggaagcaaccaccactctat
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tgtacccacagaccccaaccacagaagtagtattggtaaatgtgacagaaaattttaac
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gcctaaagccatgtgtaaaattaacccactctgtgttagtttaaagtgcactgatttgaa
gaatgatactaataaccaatagtagtagcgggagaatgataatggagaaaggagagataaaa
aactgctctttcaatatcagcacaagcataagaggtaaggtgcagaaagaatatgcatttt
tttataaaacttgatataataaccaatagataatgatactaccagctatacgttgacaagttg
taacacctcagtcattacacaggcctgtccaaagggtatcctttgagccaattcccatacat
tattgtgccccggctgggttttgcgattctaaaatgtaataataagacgttcaatggaacag
gacctgtacaaatgtcagcacagtacaatgtacacatggaattaggccagtagtatcaac
tcaactgctgttaaattggcagctctggcagaagaagaggtagtaattagatctgccaat
acagacaatgctaaaaccataatagtagcgtgaaccaatctgtagaaattaattgtacaa
gaccaacaacaatacaagaaaaagtatccgtatccagagaggaccaggaggagagcattt
gtacaataggaaaaataggaaatatgagacaagcacattgtaacattagtagagcaaaat
ggaataacacttttaaacagatagatagcaaattaagagaacaatttggaataataaaa
caataatctttaagcagtcctcaggaggggacccagaaattgtaacgcacagttttaatt
gtggagggaatttttctactgtaattcaacacaactgtttaatagtacttggtttaatag
tacttggagtactaaagggtcaaataacactgaagggaagtgcacaaatcacctcccatg
cagaaataaaacaattataaacatgtggcaggaagtaggaaaagcaatgtatgccctcc
catcagtggacaaattagatgttcatcaaatattacagggtgctattaacaagagatgg
tggtgaatagcaacaatgagtcagatcttcagacctggaggaggagatatgagggaca
attggagaaagtgaattatataaatataaagtagtaaaaattgaaccattaggagtag
cacccaccaaggcaagagagaagagtggtgcagACTAGTgcagtggggaataggagctt

ΔCleavage site(**agagaaaaaaga**) →SpeI

tgttccttgggttcttgggagcagcaggaagcactatgggcgagcgtcaatgacgctgac
gggtacaggccagacaattattgtctggtatagtgcagcagcagaacaatttgc
tgagggcgaacagcatctgttgcaactcacagtctggggcatcaagcagctccagg
caaagaatcctggctgtggaaagatacctaaggaatcaacagctcctggggattt
gggggttgctctggaaaactcatttgcaccactgctgtgccttggaatgctagt
tgagtaataaatctctggaacagatttggaaataacatgacctggatggagtggg
acagagaaattaacaattacacaa gcttaatacactccttaattgaagaatcg
caaaaccagcaagaaaagaatgaacaagaatt attggaattagataaatggg
caagtttgtggaattggtttaacatacaaatggctgtgtgtatataaaattat
tcataatgatagtaggaggttggtaggtttaagaatagtttttgcgtgtact
tttctgtagtgaaatagagttaggcagggatattcaccattatcgtttcagac
ccacctccaatcccagggggacccgacaggcccgaagggaatagaagaagaag
gtggagagagagacagagacagatccattcgattagtgaaacggatccttagc
acttatctggtaa

TOPREF "SEEDREF"

FIGURE 41A

DNA Sequence of Full length HIV-1 Gag [SEQ ID NO: 17]:

ggctagaaggagagaggatggggtgcgagagcgtcagtattaagcgggggag
aattagatcgatgggaaaaaattcggttaaggccagggggaaagaaaaaat
ataaattaaaacatatagtatgggcaagcaggggagctagaacgactacaac
catcccttcagacaggatcagaagaacttagatcattatataatacagtag
caaccctctatttgtgtgcatcaaaggatagagataaaagacaccaaggaag
ctttagacaagatagaggaagagcaaaaacaaaagtaagaaaaaagcacagc
aagcagcagctgacacaggacacagcagtcagggtcagccaaaattacccta
tagtgcagaacatccagggggcaaattggtacatcaggccatatcacctagaa
ctttaaatgcatgggtaaaagtagtagaagagaaggcttttcagcccagaag
taatacccatgtttttcagcattatcagaaggagccaccccacaagatttaa
acaccatgctaaacacagtggggggacatcaagcagccatgcaaattgttaa
aagagaccatcaatgaggaagctgcagaatgggatatagagtacatccagtgc
atgcagggcctattgcaccaggccagatgagagaaccaaggggaagtgaca
tagcaggaactactagtagtacccttcaggaacaaataggatggatgacaaata
atccacctatcccagtaggagaaatttataaaaagatggataatcctgggat
taaataaaaatagtaagaatgtatagccctaccagcatttctggacataagac
aaggaccaaagaaccttttagagactatgtagaccggttctataaaactc
taagagccgagcaagcttcacaggaggtaaaaaattggatgacagaaacct
tggttggtccaaaatgcgaacccagattgtaagactattttaaaagcatttg
gaccagcggctacactagaagaaatgatgacagcatgtcagggagtaggag
gacccggccataaggcaagagttttggctgaagcaatgagccaagtaacaa
atacagctaccataatgatgcagagaggcaattttaggaaccaaagaaaga
tggttaagtgtttcaattgtggcaagaagggcacacagccagaaattgca
gggcccctaggaaaaagggtgttggaatgtggaaaggaaggacaccaa
tgaaagattgtactgagagacaggctaatttttttagggaagatctggcctt
cctacaaggggaaggccaggggaattttcttcagagcagaccagagccaacag
ccccaccatttcttcagagcagaccagagccaacagccccaccagaagaga
gcttcagggtctggggtagagacaacaactccccctcagaagcaggagccga
tagacaaggaactgtatcctttaacttccttcagatcactctttggcaacg
accctcgtcacaataa

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FIGURE 41B

Amino Acid Sequence of HIV-1 (Strain BH10) Gag [SEQ ID NO: 18]:

M	G	A	R	A	S	V	L	S	G	G	E	L	D	R	W	E	K
I	R	L	R	P	G	G	K	K	K	Y	K	L	K	H	I	V	W
A	S	R	E	L	E	R	L	Q	P	S	L	Q	T	G	S	E	E
L	R	S	L	Y	N	T	V	A	T	L	Y	C	V	H	Q	R	I
E	I	K	D	T	K	E	A	L	D	K	I	E	E	E	Q	N	K
S	K	K	K	A	Q	Q	A	A	A	D	T	G	H	S	Q	Q	V
S	Q	N	Y	P	I	V	Q	N	I	Q	G	Q	M	V	H	Q	A
I	S	P	R	T	L	N	A	W	V	K	V	V	E	E	K	A	F
S	P	E	V	I	P	M	F	S	A	L	S	E	G	A	T	P	Q
D	L	N	T	M	L	N	T	V	G	G	H	Q	A	A	M	Q	M
L	K	E	T	I	N	E	E	A	A	E	W	D	R	V	H	P	V
H	A	G	P	I	A	P	G	Q	M	R	E	P	R	G	S	D	I
A	G	T	T	S	T	L	Q	E	Q	I	G	W	M	T	N	N	P
P	I	P	V	G	E	I	Y	K	R	W	I	I	L	G	L	N	K
I	V	R	M	Y	S	P	T	S	I	L	D	I	R	Q	G	P	K
E	P	F	R	D	Y	V	D	R	F	Y	K	T	L	R	A	E	Q
A	S	Q	E	V	K	N	W	M	T	E	T	L	L	V	Q	N	A
N	P	D	C	K	T	I	L	K	A	L	G	P	A	A	T	L	E
E	M	M	T	A	C	Q	G	V	G	G	P	G	H	K	A	R	V
L	A	E	A	M	S	Q	V	T	N	T	A	T	I	M	M	Q	R
G	N	F	R	N	Q	R	K	M	V	K	C	F	N	C	G	K	E
G	H	T	A	R	N	C	R	A	P	R	K	K	G	C	W	K	C
G	K	E	G	H	Q	M	K	D	C	T	E	R	Q	A	N	F	L
P	K	I	W	P	S	Y	K	G	R	P	G	N	F	L	Q	S	R
P	E	P	T	A	P	P	F	L	Q	S	R	P	E	P	T	A	P
E	P	E	S	F	R	S	G	V	E	T	T	T	P	P	Q	K	Q
N	D	P	S	S	Q	*	Y	P	L	T	S	L	R	S	L	F	G

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FIGURE 42

DNA Sequence of E^mΔCΔT⁹⁹.T.R (HIV strain pNL4-3) [SEQ ID NO: 19]:

Gaattctgcaacaactgctgtttatccatttcagaattgggtgtcgacatag

EcoRI

cagaataggcgttactcgacagaggagagcaagaaatggagccagtagatcctagactagagccctggaagca
tccaggaagtcagcctaaaactgcttgtaccaattgctattgtaaaaagtgttgctttcattgccaagtttgt
ttcatgacaaaagccttaggcatctcctatggcaggaagaagcggagacagcgacgaagagctcatcagaaca
gtcagactcatcaagcttctctatcaaagcagtaagtagtacatgtaatgcaacctataatagtagcaatagt
agcattagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatataggaaaatatta
agacaaagaaaaatagacagggttaattgatagactaatagaaagagcagaagacagtggcaatgagagtgaag
gagaagtatcagcacttgtggagatgggggtggaaatggggcaccatgctccttgggatattgatgatctgta
gtgctacagaaaaattgtgggtcacagtcctattatgggggtacctgtgtggaaggaagcaaccaccactctatt
ttgtgcatcagatgctaaagcatatgatacagagggtacataatgtttgggcccacacatgcctgtgtaccaca
gaccccaacccacaagaagtagtatttggtaaatgtgacagaaaaattttaacatgtggaaaaatgacatggtag
aacagatgcatgaggatataatcagtttatgggatcaaagcctaaagccatgtgtaaaaattaaccccactctg
tgtagtttaagtgcactgatttgaagaatgataactaataccaatagtagtagcgaggagaatgataatggag
aaaggagagataaaaaactgctctttcaatatcagcacaagcataagagataaggtgcagaaagaatatgcat
tcttttataaaacttgatatagtagtaaccaatagataatacca
gctataggttgataagttgtaaacacctcagtcattacacaggcctgtccaaaggtatcctttgagccaattcc
catacattattgtgccccggctgggttttgcgattctaaaatgtaataataagacgttcaatggaacaggacca
tgtacaaatgtcagcacagtagaattgtacacatggaatcaggccagtagtatcaactcaactgctgttaaatg
gcagtcctagcagaagaagatgtagtaattagatctgccaatttcacagacaatgctaaaaccataatagtaca
gctgaacacatctgtagaaattaattgtacaagacccaacaacaatacaagaaaaagtatccgtatccagagg
ggaccagggagagcatttgttacaataggaaaaataggaaatatgagacaagcacattgttaacattagtagag
caaatggaatgccactttaaaacagatagctagcaaatgaagagaacaatttggaaataataaaacaataat
ctttaagcaatcctcaggaggggagccagaaattgtaacgcacagttttaattgtggaggggaatttttctac
tgtaattcaacacaactgtttaatagtacttgggttaatagtacttggagtactgaagggtcaaataacactg
aaggaagtgcacaatcacactcccatgcagaataaaacaattttataaacatgtggcaggaagttaggaaaagc
aatgtatgcccctcccatcagtggaacaaattagatgttcatcaaatattactgggctgctattaacaagagat
gggtggaataaacaacaatgggtccgagatcttcagacctggaggaggcgatagagggacaattggagaagtg
aattatataaatataaagtagtaaaaattgaaccattaggagtagcaccaccaaggcaagagagaagagtgggt
gcagACTAGTgcagtggaataggagctttgttccttg

ΔCleavage site (agagaaaaaaga) → SpeI

ggttcttgggagcagcaggaagcactatgggctgcacgtcaatgacgctgacggtacaggccagacaattatt
gtctgatatagtgcagcagcagaacaatttgctgagggctattgaggcgcaacagcatctgttgcaactcaca
gtctggggcatcaaacagctccaggcaagaatcctggctgtggaaagatacctaaaggatcaacagctcctgg
ggatttggggttgcctctggaaaactcatttgcaccactgctgtgccttggaaatgctagttggagtaataaatc
tctggaacagatttggaaataacatgacctggatggagtgggacagagaaattaacaattacacaagcttaata
cactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagataaatggg
caagtttgtggaattgggttaacataacaaattggctgtggtatataaaattattcataatgatagtaggagg
cttggttaggtttaagaatagtttttgcgtgtactttctatagtgtaatagagttaggcagggatattcaccatta
tcgtttcagacccacctcccaatcccagggggacccgacaggcccgaggaatagaagaagaaggtggagaga
gagacagagacagatccattcgattagtgaaacggatccttagcacttatctgggacgatctgcgggagcctgtg
cctcttcagctaccaccgcttgagagacttactcttgattgtaacgaggattgtggaacttctgggacgcagg
gggtgggaagccctcaaatattgggtggaatctcctacagatttggagtcaggaactaaagaatagtgctgtta
acttgcctcaatgccacagccatagcagtagctgagtaa

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FIGURE 43

DNA Sequence of E^mΔV₁₂ΔCAT⁹⁹.T.R (Strain pNL4-3) [SEQ ID NO: 20]:

Gaattctgcaacaactgctgtttatccatttcagaattgggtgtcgacatag
EcoRI

Cagaataggcgttactcgacagaggagagcaagaaatggagccagtagatcctagactagagccctggaagca
tccaggaagtgcgcctaaaactgcttgtaccaattgctattgtaaaaagtgttgcctttcattgccaagtttgt
ttcatgacaaaagccttaggcatctcctatggcaggaagaagcggagacagcgacgaagagctcatcagaaca
gtcagactcatcaagcttctctatcaaagcagtaagtagtacatgtaatgcaacctataatagtagcaatagt
agcattagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatataggaaaatatta
agacaaagaaaaatagacaggttaattgatagactaatagaaagacagaagacagtggaatgagagtgaag
gagaagtagcagcacttgtggagatgggggtggaatggggcaccatgctccttgggatattgatgatctgta
gtgctacagaaaaattgtgggtcacagctctattatgggtacctgtgtggaaggaagcaaccaccactctatt
ttgtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggccacacatgcctgtgtaccaca
gaccccaaccacagaagtagtattggtaaatgtgacagaaaaatttaacatgtggaaaaatgacatggtag
aacagatgcatgaggatataatcagtttatgggatcaaagcctaaagccatgtgtaaaattaacccactctg
tggt ΔV1 and V2 loops

Agttgtaacacctcagtcattacacagggcctgtccaaaggatcctttgagccaattcccatacattattgtg
ccccgctggttttgcgattctaaaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtcag
cacagtacaatgtacacatggaatcaggccagtagtatcaactcaactgctgttaaatggcagctctagcagaa
gaagatgtagtaattagatctgccatttcacagacaatgctaaaaccataatagtagcagctgaacacatctg
tagaaattaattgtacaagacccaacaacaatacaagaaaaagtagtccgtatccagaggggaccaggagagc
atttgttacaataggaaaaataggaaatatgagacaaagcacttgaacattagtagagcaaaatggaatgcc
actttaaacagatagctagcaaatgaagagaacaatttggaataataaaacaataatctttaagcaatcct
caggaggggaccagaaattgtaacgcacagttttaattgtggaggggaatttttctactgtaattcaacaca
actgtttaatagtagtacttggtttaatagtagtacttggagtagtgaagggtaacataacactgaaggaagtgcaca
atcacactcccatgcagaataaaacaattttataaacatgtggcaggaagtaggaaaagcaatgtatgcccctc
ccatcagtggaacaaattagatgttcatcaaatattactgggctgctattaaacaagagatgggtggaataacaa
caatgggtccgagatcttcagacctggaggaggcgatagaggggacaattggagaagtgaattatataaatat
aaagtagtaaaaattgaaccattaggagtagcaccaccaaggcaagagaagagtggtgcagACTAGTgcag
tgggaataggagctttgttccttgggttcttgggagca

ΔCleavage site (agagaaaaaga) → SpeI

gcaggaagcactatgggctgcacgtcaatgacgctgacggtagcagccagacaattattgtctgatatagtagc
agcagcagaacaatttgcctgagggctattgaggcgcaacagcatctgttgcaactcacagctctgggcatcaa
acagctccaggcaagaatcctggctgtggaagatacctaaggatcaacagctcctggggatttggggttgc
tctggaaaactcatttgcaccactgctgtgccttgggaatgctagttggagtaataaatctctggaacagattt
ggaataacatgacctggatggagtgggacagagaaattaacaattacacaagcttaatacactccttaattga
agaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagataaatgggcaagtttgtggaat
tggtttaacataacaaattggctgtggtatataaaattattcataatgatagtaggaggcttggtaggtttaa
gaatagtttttgcctgactttctatagtagaatagagttaggcagggatattcaccattatcgtttcagaccca
cctcccaatcccgaggggacccgacagggccgaaggaatagaagaagaagggtggagagagagacagagacaga
tccattcgatttagtgaacggatccttagcacttatctgggacgatctgcggagcctgtgcctcttcagctacc
accgcttgagagacttactcttgattgtaacgaggattgtggaacttctgggacgcaggggggtgggaagccct
caaatattgggtggaatctcctacagtagtggagtcaggaactaaagaatagtagtctgttaacttgctcaatgcc
acagccatagcagtagctgagtaa

FIGURE 44

DNA Sequence of Env^mΔC.T.R.N (Strain BH10) [SEQ ID NO: 21]:

Gaattctgcaacaactgctgtttatccatcttcagaattgggtgtcgacat
EcoRI

agcagaataggcggtactcgacagaggagagcaagaaatggagccagtagatcctagactagagccctgga
agcatccaggaagtgcagcctaaaactgcttgtaccaattgctattgtaaaaagtgttgctttcattgccaa
gtttgtttcatacaaaaagccttaggcattctcctatggcaggaagaagcggagacagcgacgaagacctcc
tcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagtacatgtaatgcaacctatacaaa
tagcaatagtagcatttagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatat
aggaaaatattaagacaaagaaaaatagacaggttaattgtagactaatagaaagagcagaagacagtgg
caatgagagtgaaggagaaatcatcagcacttgtggagatgggggtggagatggggcaccatgctccttggg
atgttgatgatctgtagtgtacagaaaaattgtgggtcacagtcatttatgggtacctgtgtggaagga
agcaaccaccactctatcttgtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggcca
cacatgcctgtgtacccacagaccccaaccacagaagtagtatttggtaaatgtgacagaaaaattttaac
atgtggaaaaatgacatggtagaacagatgcatgaggatataatcagtttatgggatcaaagcctaaagcc
atgtgtaaaaattaacccactctgtgttagtttaaagtgcactgatttgaagaatgatactaataccaata
gtagtagcgggagaatgataatggagaaaggagagataaaaaactgctctttcaatatcagcacaagcata
agaggttaaggtgcagaaagaatatgcattttttataaaacttgatataataccaatagataatgatactac
cagctatacgttgacaagttgtaacacctcagtcattacacaggcctgtccaaaggtatcctttgagccaa
ttcccatacattattgtgccccggtggttttgcgattctaaaatgtaataataagacgttcaatggaaca
ggaccatgtacaaatgtcagcacagtacaatgtacacatggaattaggccagtagtatcaactcaactgct
gttaaattggcagtcgtggcagaagaagaggttagtaattagatctgccaatttcacagacaatgctaaaacca
taatagtacagctgaaccaatctgtagaatttaattgtacaagacccaacaacaatacaagaaaaagtatc
cgtatccagagaggaccaggagagcatttgttacaataggaaaaataggaaatagagacaagcacattg
taacattagtagagcaaaatggaataacactttaaaacagatagatagcaaattaagagaacaatttgga
ataataaaacaataatctttaagcagtcctcaggaggggacccagaaattgtaacgcacagttttaattgt
ggaggggaatttttctactgtaattcaacacaactgtttaatagtacttggtttaatagtacttgagtag
taaaggtcaataacactgaaggaagtgcacaaatcacctcccatgcagaataaaacaattataaaca
tgtggcaggaagttaggaaaagcaatgtatgccctcccatcagtggaacaaattagatgttcacaaatatt
acagggctgctattaacaagagatggtggttaatagcaacaatgagtcagagatcttcagacctggaggagg
agatagtaggagacaattggagaagtgaattatataaatataaagttagtaaaattgaaccattaggagtag
caccaccaaggcaaagagaagagtggtgcagACTAGTgcagtggaataggagctttgttccttgggttc
t

ΔCleavage site (agagaaaaaga)→SpeI

tgggagcagcaggaagcactatgggcgagcgtcaatgacgctgacggtagcagggcagacaattattgtct
ggtatagtgcagcagcagaacaatttgcctgagggctattgagggcgcaacagcatctgttgcaactcacagt
ctggggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaaggatcaacagctcctgg
ggatttgggggttgcctctggaaaactcatttgcaccactgctgtgccttgggaatgctagttggagtaataaa
tctctggaacagatttgggaataacatgacctggatggagtgggacagagaaattaacaattacacaagctt
aatacactccttaattgaagaatcgaaaaccagcaagaaaagaatgaacaagaattattggaattagata
aatgggcaagtttgtggaattggtttaacataacaaattggctgtggtatataaaaattattcataatgata
gtaggaggttggtaggtttaagaatagtttttgcctgactttctgtagtgaatagagtttaggcagggtata
ttcaccattatcgtttcagacccacctcccaatcccgaggggacccgacaggcccgaaggaatagaagaag
aaggtggagagagagacagagacagatccattcgattagtgaacggatccttagcacttatctgggacgat
ctgaggagcctgtgcctcttcagctaccaccgcttgagagacttactcttgattgtaacgaggatttgtgga
acttctgggacgcaggggggtgggaagccctcaaatattggtggaatctcctacagtagttggagtgcaggagc
taaagaatagtgtgttagcttgcctcaatgccacagctatagcagtagctgaggggacagatagggtata
gaagtgtacaaggagcttatagagctattcgccacatcctagaagaataagacagggccttggaaggat
tttgctataagatgggtggcaagtgtggtcaaaaagtgtgtggttggtggatggcctgctgtaagggaagaatg
agacagctgagccagcagcagatgggggtgggagcagcatctcgagacctagaaaaacatggagcaatcac
aagtagcaacacagcagctaacaatgctgatttgtgcctggctagaagcacaagaggaggaggaggtgggtt
ttccagtcacacctcaggtacctttaagaccaatgacttacaaggcagctgtagatcttagccacttttta
aaagaaaaggggggactggaagggtcaattcactcccaacgaagacaagatatccttgatctgtggatcta
ccacacacaaggctacttccctgatttag

FIGURE 45

DNA Sequence of E^mΔC.N (Strain BH10) [SEQ ID NO: 22]:

Gaattcgccaccatgggagtgaggagaaatatcagcacttgtggagatgg

EcoRI Kozak NcoI

gggtggagatggggcaccatgctccttgggatgttgatgatctgtagtgctacagaaaaattgtgggtcac
agtctattatggggtagctgtgtggaaggaagcaaccaccactctattttgtgcatcagatgctaaagcat
atgatacagagggtacataatgtttgggccacacatgcctgtgtacccacagacccaaccacacaagaagta
gtattggtaaatgtgacagaaaaattttaacatgtggaaaaatgacatggtagaacagatgcatgaggatat
aatcagtttatgggatcaaagcctaaagccatgtgtaaaaattaacccactctgtgttagtttaaagtga
ctgatttgaagaatgataactaataccaatagtagtagcgggagaatgataatggagaaaggagagataaaa
aactgctctttcaatatcagcacaagcataagaggtgaaggtgcagaaagaatatgcattttttataaact
tgatataataccaatagataatgatactaccagctatacgttgacaagttgtaacacctcagtcattacac
aggcctgtccaaaggtatcctttgagccaattcccatacattattgtgccccggtgggttttgcgattcta
aaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtcagcacagtacaatgtacacatgg
aattaggccagtagtatcaactcaactgctgttaaattggcagctctggcagaagaagaggtagtaattagat
ctgccaatttcacagacaatgctaaaaccataatagtagcagctgaaccaatctgtagaaattaattgtaca
agacccaacaacaatacaagaaaaagtatccgtatccagagaggaccaggaggagagcatttgttacaatagg
aaaaataggaaatatgagacaagcacattgttaacattagtagagcaaaatggaataacactttaaaacaga
tagatagcaaatgaagaacaatttggaaataataaaacaataatctttaagcagtcctcaggagggggac
ccagaaattgtaacgcacagttttaattgtggaggggaatttttctactgtaattcaacacaactgtttaa
tagtacttgggttaatatgacttggagtactaaaggtcaaataacactgaaggaagtgcacacacacccc
tcccatgcagaataaaacaaattataaacatgtggcaggaagtaggaaaagcaatgtatgcccctcccatc
agtggacaaattagatgttcatcaaatattacagggctgctattaacaagagatggtggtaatagcaacaa
tgagtcagagatcttcagacctggaggaggagatagagggacaattggagaagtgaattatataaatata
aagtagtaaaaattgaaccattaggagtagcaccaccaaaggcaaagagaagagtggtgcagACTAGTgca
gtgggaatataggagctttgttcccttgggttcttgggagc

ΔCleavage site(agagaaaaaga)→SpeI

agcaggaagcactatgggcgcagcgtcaatgacgctgacggtacagggccagacaattattgtctggtatag
tgacagcagcagaacaatttgcctgagggctattgagggcgcaacagcatctgttgcaactcacagctctggggc
atcaagcagctccaggcaagaatcctggctgtggaaagatacctaaaggatcaacagctcctggggatttg
gggtgctctggaactcatttgcaccactgctgtgccttggaatgctagttggagtaataaatctctgg
aacagatttggaaataacatgacctggatggagtgggacagagaaaattaacaattacacaagcttaatacac
tccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagataaatgggc
aagtttgtggaattgggttaacataacaaattggctgtggtatataaaattattcataatgatagtaggag
gcttggtaggtttaagaatagtttttgcctgtactttctgtagtgaatagagttaggcagggatattcacca
ttatcgtttcagacccacctcccaatcccagggggacccgacagggcccgaaggaatagaagaagaaggtgg
agagagagacagagacagatccattcgattagtgaacggatccttagcacttatctgggacgatctgcgga
gcctgtgcctcttcagctaccaccgcttgagagacttactcttgattgtaacgaggattgtggaacttctg
ggacgcaggggggtgggaagccctcaaataattgggtggaatctcctacagatttgagtcaggagctaaagaa
tagtgctgttagcttgcctaatgccacagctatagcagtagctgaggggacagatagggttatagaagtag
tacaaggagcttatagagctattcgccacatacctagaagaataagacagggcttggaaaggattttgcta
taagatgggtggcaagtgtgtaaaaaagtagtggttggtggcctgctgtaagggaaagaatgagacgag
ctgagccagcagcagatggggtgggagcagcatctcgagacctagaaaaacatggagcaatcacaagtagc
aacacagcagctaacaatgctgattgtgcctggctagaagcacaagaggaggaggaggtgggttttccagt
cacacctcaggtacctttaagaccaatgacttacaaggcagctgtagatcttagccactttttaaaagaaa
aggggggactggaagggttaattcactcccaacgaagacaagatatccttgatctgtggatctaccacaca
caaggctacttccctgattag

2008-2009

Gaattctgcaacaactgctgtttatccattttcagaattgggtgtcgacat
EcoRI

Agcagaataggcgttactcgacagaggagagcaagaa**atgg**agccagtaga

Tat 1

tcttagactagagccctggaagcatccaggaagtgcagcctaaactgcttgtaaccaattgctattgtgtaaaa
agtgttgctttcattgccaagtttgtttcataacaaaagccttaggcattctcctatggcaggaagaagcgg
agacagcgacgaagacctcctcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagtaca
tgtaatgcaacctatacaaatagcaatagtagcattagtagtagcaataataatagcaatagttgtgtggt
ccatagtaatcatagaatataggaaaatattaagacaaaagaaaaatagacagggttaattgatagactaata
gaaagagcagaagacagtgga**at**gagagtggaaggagaaatatcagcacttggtggagatgggggtggagat
ggggcaccatgctccttgggatgttgatgatctgtagtgtctacagaaaaattgtgggtcacagtcattat
ggggtacctgtgtggaaggaagcaaccaccactctattttgtgcatcagatgctaaagcatatgatacaga
ggtacataatgtttgggccacacatgcctgtgtacccacagaccccaaccacagaagtagtattggtaa
atgtgacagaaaaattttaacatgtggaaaaatgacatggtagaacagatgcatgaggtatataatcagttta
tgggatcaaagcctaaagccatgtgtaaaattaaacccactctgtgttagtttaaagtcactgattttgaa
gaatgatactaataaccaatagtagtagcgggagaatgataatggagaaggagagataaaaaactgctctt
tcaatatcagcacaagcataagaggtgaaggtgcagaaagaatatgcatttttttataaaacttgatataata
ccaatagataatgatactaccagctatacgttgacaagttgtaacacctcagtcattacacaggcctgtcc
aaaggtatcctttgagccaattcccatacattattgtgccccggtggttttgcgattctaaaatgtaata
ataagacgttcaatggaacaggaccatgtacaaatgtcagcacagtacaatgtacacatggaattaggcca
gtagtatcaactcaactgctgttaaatggcagtcctggcagaagaagaggtagtaattagatctgccaattt
cacagacaatgctaaaaccataatagtacagctgaaccaatctgtagaaatttaattgtacaagacccaaca
acaatacaagaaaaagtatccgtatccagagaggaccaggggagagcatttgttacaataggaaaaatagga
aatatgagacaagcacattgttaacattagtagagcaaaatggaataacactttaaaacagatagatagcaa
attaagagaacaattttgaaataataaaaacaataatctttaagcagtcctcaggaggggacccagaaattg
taacgcacagttttaattgtggaggggaatttttctactgtaattcaacacaactgtttaatagtacttg
tttaatagtacttggagtactaaaggtcaaataacactgaagggaagtgcacaaatcacccctcccattgcag
aataaaacaaattataaacatgtggcaggaagtaggaaaagcaatgtatgccctcccactcagtggaacaa
ttagatgttcatcaaatattacagggtctgctattaacaagagatgggtgtaatagcacaatgagtcgag
atcttcagacctggaggaggagatagagggacaattggagaagtgaaattatataaatataaagtagtaaaa
aattgaaccattgaggtagtaccacccaaggcagaagagagtggtgcag**ACTAGT**gcagtggaatag
gagctttgttccttgggttc

ΔCleavage site (agagaaaaaaga) → SpeI

tgtggagcagcaggaagcactatgggcgcagcgtcaatgacgctgacggtacaggccagacaattattgtc
tggatatagtgcagcagcagaacaatttgcctgagggctattgaggcgcaacagcatctgttgcaactcacag
tctggggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaaggatcaacagctcctg
gggatttggggttgctctggaaaactcatttgcaccactgctgtgccttggaatgctagttaggagtaataa
atctctggaacagatttggaaataacatgacctggatggagtgggacagagaaattaacaattacacaagct
taatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattatttgaattagat
aaatgggcaagtttggtgaattggtttaacataacaaattggctgtggtatataaaattattcataatgat
agtaggaggcttggtaggttaagaatagtttttgcctgtactttctgtagtgaatagagttaggcagggat
attcaccattatcgtttcagaccacctcccaatcccaggggacccgcaggcccggaaggaatagaagaa
gaaggtggagagagagacagagacagatccattcgattagtgaacggatccttagcacttatctggtaa

Figure 47

DNA Sequence of E^m/E^m (BH10) [SEQ ID NO: 24]:

Gaattcgccaccatgggagtgaggagaaatatcagcacttgtggagatgg

EcoRI Kozak NcoI

gggtggagatggggcaccatgctccttgggatgttgatgatctgtagtgtacagaaaaattgtgggtcac
agtctattatgggtacctgtgtggaagggaagcaaccaccactctatcttgtgcatcagatgctaagcat
atgatacagaggtaacataatgtttgggccacacatgcctgtgtacccacagacccaaccacaagaagta
gtattggtaaatgtgacagaaaaatttaacatgtggaaaaatgacatggtagaacagatgcatgaggatat
aatcagtttatgggatcaaagcctaaagccatgtgtaaaattaacccactctgtgttagtttaaagtgca
ctgatttgaagaatgataactaataccaatagtagtagcgggagaatgataatggagaaaggagagataaaa
aactgctctttcaatatcagcacaagcataagaggtaagggtgcagaaagaatatgcattttttataaact
tgatataataccaatagataatgatactaccagctatacgttgacaagttgtaaacacctcagtcattacac
aggcctgtccaaagggtatcctttgagccaattcccatacattattgtgccccggctgggttttgcgattcta
aaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtcagcacagtacaatgtacacatgg
aattaggccagtagtatcaactcaactgctgttaaattggcagctctggcagaagaagaggttagtaattagat
ctgccaaatttcacagacaatgctaaaaccataatagtacagctgaaccaatctgtagaaattaattgtaca
agaccaacaacaatacaagaaaaagtatccgtatccagagaggaccaggaggagcatttgttacaatagg
aaaaataggaatatgagacaagcacattgttaacattagtagagcaaaatggaataacactttaaaacaga
tagatagcaaattaagagaacaatttggaaataataaaacaataatctttaagcagtcctcaggaggggac
ccagaaattgtaacgcacagttttaattgtggaggggaatttttctactgtaattcaacacaactgtttaa
tagtacttggtttaatagtacttggagtactaaagggtcaaataacactgaagggaagtgcacaaatcacc
tcccatgcagaataaaacaaattataaacatgtggcaggaagtaggaaaagcaatgtatgccccctccatc
agtggaacaattagatgttcatcaaatattacagggtgctattaacaagagatgggtggaatagcaacaa
tgagtccgagatcttcagacctggaggaggagatataggggacaattggagaagtgaattatataaatata
aagtagtaaaaaattgaaccattaggagtagcaccaccaaggcaagagaagagtggtgcagagagaaaaa
agagcagtggaataggagctttgttccttgggttcttgggagcagcaggaagcactatgggcgcagcgtc
aatgacgctgacggtacaggccagacaattattgtctggtatagtgcagcagcagaacaatttgcagagg
ctattgaggcgcaacagcatctgttgcaactcacagctctggggcatcaagcagctccaggcaagaatcctg
gctgtggaaagatacctaaggatcaacagctcctggggatttgggggtgctctggaaaactcatttgcac
cactgctgtgccttgggaatgctagtgtggagtaataaatctctggaacagatttgggaataacatgacctgga
tgagtgaggacagagaaattaacaattacacaagcttaatacactccttaattgaagaatcgcaaaaccag
caagaaaagaatgaacaagaattattggaattagataaatgggcaagtttgtggaattggtttaacataac
aaattggctgtggtatataaaaattattcataatgatagtaggaggcttggtaggtttaagaatagttttg
ctgtactttctgtagtgaatagagtttaggcagggatattcaccattatcgtttcagacccacctcccaatc
ccgagggggacccgacaggcccgaagggaatagaagaagaaggtggagagagagacagagacagatccattcg
attagtgaacggatccttagcacttatctgggacgatctgaggagcctgtgcctcttcagctaccaccgct
tgagagacttactcttgattgtaacgaggattgtggaacttctgggacgcaggggggtgggaagccctcaa
tattggtggaatctcctacagtattggagtcaggagctaaagaatagtgtctgttagcttgctcaatgccac
agctatagcagtagctgaggggacagataggggtatagaagtagtacaaggagcttatagagctattcgcc
acatacctagaagaataagacagggttggaaaggattttgctataa

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FIGURE 48

Sequences of V3 loop Multi-clade HIV-1 Clones:

Clade	ACC#	HIV-1 Strain	From(nt)	To(nt)
B	M15654	BH10	885	992
A	U09127	192UG037WHO.01083hED	888	992
C	U09126	192BR025WHO.01093hED	876	980
D	U43386	192UG024.2	888	989
E	U08458	193TH976.17	894	998
F	U27401	193BR020.17	888	992
G	U30312	192RU131.9	885	989

Tgtacaagacccaacaacaataacaagaaaaagtatccgtatccagagagga
ccagggagagcatttgttacaataggaaaaataggaaatatgagacaagca
cattgt **Clade B [SEQ ID NO: 25]**

Tgtaccagacctaacaacaataacaagaaaaagtgtacgtataggaccagga
caaacatttctatgcaacagggtgatataataggggatataagacaagcacat
tgt **Clade A [SEQ ID NO: 26]**

Tgtacgagacccaacaataataacaagaaaaagtataaggataggaccagga
caagcatttctatgcaacaggagaaataataggagatataagacaagcacat
tgt **Clade C [SEQ ID NO: 27]**

Tgcacaaggccctacaacaataataagacaaaggacccccataggactaggg
caagcactctataacaagaagaatagaagatataagaagagcacattgt
Clade D [SEQ ID NO: 28]

Tgtaccagaccctccaccaataacaagaacaagtatacgtataggaccagga
caagtatttctatagaacaggagacataacaggagatataagaaaagcatat
tgt **Clade E [SEQ ID NO: 29]**

Tgtacaagacccaacaacaataacaagaaaaagaatatcttttaggaccagga
cgagtattttatagcaggagaaataataggagacatcagaaaggcacat
tgt **Clade F [SEQ ID NO: 30]**

Tgtaccagacctaataacaataacaagaaaaagtataacttttgcaccagga
caagcgctctatgcaacagggtgaaataataggagatataagacaagcacat
tgt **Clade G [SEQ ID NO: 31]**

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FIGURE 49A

DNA sequence of modified Env including multi-clade V3 loops [SEQ ID NO: 32]:

Atgagagtgaaggagaaatatacagcacttgtggagatgggggtggagatggggcaccatgctccttgggat
gttgatgatctgtagtgtacagaaaaattgtgggtcacagtctattatgggggtacctgtgtggaaggaag
caaccaccaactctatTTTTgtgcatcagatgctaaagcatatgatacagagggtacataatgtttgggccaca
catgctgtgtacccacagaccccaaccacaagaagtagtattggtaaattgtgacagaaaaatttaacat
gtggaaaaatgacatggttagaacagatgcatgaggatataatcagtttatgggatcaaagcctaaagccat
gtgtaaaattaaccccactctgtgttggagctggtagttgtaacacctcagt

V1, V2 deletion, GAG insertion

Cattacacaggcctgtccaaaggtatccttttgagccaattccatacattattgtgccccggctgggttttg
cgattctaaaaatgtaataaagacggtcaatggaacaggaccatgtacaaatgtcagcacagtacaatgt
acacatggaattagggcagtagtatcaactcaactgctgttaaattggcagctctggcagaagaagaggtagt
aattagatctgccaatttcacagacaatgctaaaaccataatgtacagctgaaccaatctgtagaatta
attgtacaagacccaacaacaa

Start of Clade B

Tacaagaaaaagtatccgtatccagagaggaccaggagagcatttgttacaataggaaaaataggaaata
tgagacaagcacattgtctcgggtgtaccag

Insert a *Ava*I site Clade A

Acctaacaacaatacaagaaaaagtgtacgtataggaccaggacaaacattctatgcaacagggtgatataa
taggggatataagacaagcacattgtgtgtac

Clade C

Gagaccaacaataatacaagaaaaagtataaggataggaccaggacaagcattctatgcaacaggagaaa
taataggagatataagacaagcacattgttg

Clade D

Cacaaggccctacaacaataataagacaaaggacccccataggactagggcaagcactctatacaacaagaa
gaatagaagatataagaagagcacattgttg

Clade E

Taccagacctccaccaatacaagaacaagtatacgtataggaccaggacaagtattctatagaacaggag
acataacaggagatataagaaaaagcatattgtggatcctgtacaagacccaacaacaatacaagaaaaaga
atatcttttagg

BamHI clade F

Accaggacgagtattttatacagcaggagaaataataggagacatcagaaaggcacattgtgtgtaccagac
ctaataacaatacaagaaaaagtataacttt

Clade G

Tgcaccaggacaagcgctctatgcaacagggtgaaataataggagatataagacaagcacattgtctcggga
acattagtagagcaaaatggaataaaccttt

Insert a *Ava*I

Aaaacagatagatagcaaattaagagaacaatttggaaataataaaacaataatctttaagcagtcctcag
gaggggaccagaaattgtaacgcacagttttaattgtggaggggaatttttctactgtaattcaacacaa
ctgtttaatagtacttggtttaatagtacttggagtactaaagggtcaaataacactgaagggaagtgaac
aatcacccctcccatgcagaataaaacaaattataaacatgtggcaggaagttaggaaaagcaatgtatgcc
ctcccatcagtggaacaaattagatgttcatacaatattacagggtgctattaacaagagatggtggtaat
agcaacaatgagtcgagatcttcagacctggaggaggagatagagggacaattggagaagtgaattata
taaatataaagtagtaaaaattgaaccattaggagtagcaccaccaaggcaagagaagagtggtgcaga
ctagtgcagtggg

Cleavage site mutation (*Spe*I)

Aataggagctttgttccttgggttcttgggagcagcaggaagcactatgggcgagcgtcaatgacgctga
cggtacaggccagacaattattgtctggtatagtgcagcagcagaacaatttgtgagggctattgagggc
caacagcatctgttgcaactcacagtctggggcatcaagcagctccaggcaagaatcctggctgtggaaag
atacctaaaggatcaacagctcctggggatttgggggtgctctggaaaactcatttgcaccactgctgtgc
cttgggaatgctagtgtggagtaataaatctctggaacagatttgggaataacatgacctggatggagtgggac
agagaaattaacaattacacaagcttaatacactccttaattgaagaatcgaaaaccagcaagaaaaagaa
tgaacaagaattattggaattagataaatgggcaagtttgtggaattggtttaacataacaaattggctgt
ggtatataaaaatcgtggtgctgctgctcctgctctcctcctcctcctcagggccacggatttcattgtcc
ctgtga

GPI anchor

FIGURE 49B

Amino acid sequence of modified Env including multi-clade V3 loops [SEQ ID NO: 33]:

M T T A A E I V S K V G A P F T F R Y P T T G N A N G A G V L T M R N R P L T N G Q V M S E W A
R M V S C N S G F C Q S K N V R Y P A Y T N D N G N E K N T F E W C N S T F L L I Q P T L L Y T
V L Y D V F L A E N C L T N T P A N T N R T I N E T I W N H N G Q S E E K L T L K L W W I D I D
K L Y A P N W G P N T A I N T N G N R R T I R I N K S S E S L A G V R Q L L N M E K K F
E G G K T M D S I K H E I T G N G N E I I T G R I K G N T F T D V N E Y K F Q A L G A E E W S M
K M V A D W Q C P T G E V R K N D T I R E S D K G S D T I N W T G I I K R L A I Q I S W S A W S
Y L P Y P K S N I F I E Q K I T I R I Q D I I R D I I L I C F I K T F Y R G R E A W W D Q S L L
Q M V D N N L T H N R V L S G R I K G R I R R I I T R K F G N T A G R K V A Q A R G S R N L L *
H I W T P D K S Y G P V N I N K G S D T R I K S R F Q K G S L M L P V V A L Q I C N E Q W L
L C K E Q M P V C T V I Q R M S D I I P R G A L K A A I Q E T P Y L G V Q G L Q L S K I Q N L
W S E V E V C I A G V R S I R V I R I A P Y G A P H D S F W C A L G K T S S H A G S N E W L
R A A H V E V T P S S V Q Q R R I Q G H G C P H G C S S F S R P T G I S T G L V K L N K F L
W T N V Q K Q A C T A E R A I Q G A L C Q G G C Q L K G Y T I P R D E A M I L E L E Y N N S
G E T V L M L A G T Q N I G H G A P H G C V S R C A G L G C K K I D M P V G V Q R I Q T E I L
W K T W V H T C F N L F N P C P H G C Q T F C V T L N R D N G Q S G R L G A Q L Y C I S Q T S
R L A N E P P A V L T C G L G C Q C A R Y T F R Y I E P S S I G G D G I A Q Q T L T W L E N L
W F T V D L K I S L D T R G Q C A T L P R R Y P A S Q E T N I Q N N V G S Q V K T N I L W L
G V C H T I C V L T N N R A C T F R Y S T P T N T R F I Q N N I S W A A M N W D A N H L L Q

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FIGURE 50A

1. DNA sequence of p17/24 in natural form [SEQ ID NO: 34]:

atgggtgcgagagcggtcagtattaagcgggggagaattagatcgatgggaaaaaattcggttaaggccagg
gggaaagaaaaatataaattaaaacatatagtatgggcaagcaggagctagaacgattcgagttaatc
ctggcctgtagaaacatcagaaggctgtagacaaatactgggacagctacaacccatcccttcagacagga
tcagaagaacttagatcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaa
agacaccaaggaagcttttagacaagatagaggaagagcaaaacaaaagtaagaaaaagcacagcaagcag
cagctgacacaggacacagcagtcaggtcagccaaaattaccctatagtgagaacatccaggggcaaatg
gtacatcaggccatatcacctagaacttttaaatgcatgggtaaaagtagtagaagagaaggctttcagccc
agaagtaatacccatgttttcagcattatcagaaggagccaccccaagatttaaacaccatgctaataca
cagtggggggacatcaagcagccatgcaaattgttaaagagaccatcaatgaggaagctgcagaatgggat
agagtacatccagtgcatgcagggcctattgcaccaggccagatgagagaaccaagggggaagtgcatagc
aggaactactagtagcccttcaggaacaaataggatggatgacaaataatccacctatcccagtaggagaaa
tttataaaagatggataatcctgggattaaataaaatagtaagaatgtatagccctaccagcattctggac
ataagacaaggaccaaagaaccttttagagactatgtagaccggttctataaaactctaagagccgagca
agcttcacaggaggttaaaaaattggatgacagaaaccttgttggtccaaaatgcgaaccagattgtaaga
ctattttaaaagcattgggaccagcggtacactagaagaatgatgacagcatgtcaggggagttaggagga
cccggccataaggcaagagttttgtaa

2. DNA sequence of p17/24 in secreted form [SEQ ID NO: 35]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg

gp120 signal peptide

ggcaccatgctccttgggatgttgatgatctgtagtgtggtgcgagagcg

p17/p24

tcagtattaagcgggggagaattagatcgatgggaaaaaattcggttaaggccagggggaaagaaaaata
taaattaaaacatatagtatgggcaagcaggagctagaacgattcgagttaatcctggcctgtagaaa
catcagaaggctgtagacaaatactgggacagctacaacccatcccttcagacaggatcagaagaacttaga
tcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagc
tttagacaagatagaggaagagcaaaacaaaagtaagaaaaagcacagcaagcagcagctgacacaggac
acagcagtcaggtcagccaaaattaccctatagtgagaacatccaggggcaaattggtacatcaggccata
tcacctagaacttttaaatgcatgggtaaaagtagtagaagagaaggctttcagcccagaagtaatacccat
gttttcagcattatcagaaggagccaccccaagatttaaacaccatgctaatacagtggtgggggacatc
aagcagccatgcaaattgttaaagagaccatcaatgaggaagctgcagaatgggatagagtacatccagtg
catgcagggcctattgcaccaggccagatgagagaaccaagggggaagtgcatagcagggaactactagtac
ccttcaggaacaaataggatggatgacaaataatccacctatcccagtaggagaaatttataaaagatgga
taatcctgggattaaataaaatagtaagaatgtatagccctaccagcattctggacataagacaaggacca
aaagaaccttttagagactatgtagaccggttctataaaactctaagagccgagcaagcttcacaggaggt
aaaaaattggatgacagaaaccttgttggtccaaaatgcgaaccagattgtaagactattttaaaagcat
tgggaccagcggtacactagaagaatgatgacagcatgtcaggggagttaggaggacccggccataaggca
agagttttgtaa

FIGURE 50A -continued

1. DNA sequence of p17/24 in membrane form [SEQ ID NO: 36]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg

gp120 signal peptide

Ggcacatgctccttgggatgttgatgatctgtagtgctggtgcgagagcg

P17/p24

tcagtattaagcgggggagaattagatcgatgggaaaaaattcggttaaggccagggggaaagaaaaaata
taaattaaaacatatagtatgggcaagcaggagctagaacgattcgcagttaatcctggcctgttagaaa
catcagaaggctgtagacaaatactgggacagctacaacatcccttcagacaggatcagaagaacttaga
tcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagc
tttagacaagatagaggaagagcaaaacaaaagtaagaaaaaagcacagcaagcagcagctgacacaggac
acagcagtcagggtcagccaaaattaccctatagtgacagaacatccagggggcaaatggtacatcaggccata
tcacctagaactttaaatgcatgggtaaaagtagtagaagagaaggctttcagcccagaagtaatacccat
gttttcagcattatcagaaggagccaccccacaagatttaaacaccatgctaaacacagtggggggacatc
aagcagccatgcaaagttaaagagaccatcaatgaggaagctgcagaatgggatagagtacatccagtg
catgcagggcctattgcaccaggccagatgagagaaccaaggggaagtgcatagcaggaactactagtac
ccttcaggaacaaataggatggatgacaaataatccacctatcccagtaggagaaatttataaaagatgga
taatcctgggattaaataaaaatagtaagaatgtatagccctaccagcattctggacataagacaaggacca
aaagaaccttttagagactatgtagaccggttctataaaaactctaagagccgagcaagcttcacaggaggt
aaaaaattggatgacagaaaccttgttgggtccaaaatgcgaaccagattgtaagactattttaaaagcat
tgggaccagcggctacactagaagaaatgatgacagcatgtcaggagtaggaggacccggccataaggca
agagttttg

ttattcataatgatagtaggaggttggtaggtttaagaatagtttttgctgtactttctgtagtgaatag

agttaggcagggatattcaccattatcgtttcagacccacctcccaatcccagggggataa

gp41 transmembrane domain

10003035-110101

FIGURE 50B

1. Amino acid sequence of p17/24 in natural form [SEQ ID NO: 37]:

M	G	A	R	A	S	V	L	S	G	G	E	L	D	R	W	E	K
I	R	L	R	P	G	G	K	K	R	Y	K	K	K	H	I	V	W
A	S	R	E	L	E	R	F	A	L	N	P	L	L	L	E	T	S
E	G	C	R	Q	I	L	G	Q	V	Q	P	S	L	Q	T	G	S
E	E	L	R	S	L	Y	N	T	A	A	T	L	I	C	V	H	Q
R	I	E	I	K	D	T	K	E	P	A	D	K	I	E	H	E	Q
N	K	S	K	N	K	A	Q	Q	I	A	I	Q	T	G	M	S	H
Q	V	S	Q	P	R	T	I	N	L	W	V	K	V	Q	E	A	K
A	A	I	S	E	V	I	P	M	P	S	A	L	S	V	A	T	M
P	Q	S	P	N	T	M	L	N	E	V	G	G	H	E	R	A	H
P	M	D	L	G	P	I	N	A	P	Q	A	E	W	Q	R	V	S
D	I	H	A	T	T	S	A	T	Q	E	M	R	I	P	M	G	T
N	P	A	I	R	V	G	T	E	Y	K	R	W	D	I	L	Q	N
N	K	P	V	F	M	D	S	P	D	S	I	L	K	T	L	R	G
P	Q	E	S	Q	C	V	Y	V	W	R	F	Y	T	L	L	V	A
E	A	A	P	D	T	K	K	I	L	M	T	E	G	P	A	A	Q
N	E	N	M	M		A	T	Q	G	V	A	L	P	G	H	K	T
L	V	L	*				C				G	G					A

2. Amino acid sequence of p17/24 in secreted form [SEQ ID NO: 38]:

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	G	A	R	A	S	V
L	S	G	G	E	L	D	R	W	E	K	I	R	L	R	P	R	G
K	K	K	Y	K	L	K	H	I	V	W	A	S	R	E	L	E	R
F	A	V	N	P	L	L	L	E	T	S	E	G	C	R	Q	I	L
G	Q	A	Q	T	G	I	Q	T	G	S	E	E	L	S	K	D	Y
N	T	A	A	D	D	T	C	V	H	Q	R	I	E	K	N	K	T
K	Q	A	A	A	D	T	G	H	S	S	Q	V	S	Q	N	Y	P
Q	Q	A	A	A	Q	T	G	H	S	S	Q	V	S	Q	N	Y	P
I	V	Q	A	I	Q	V	Q	M	V	H	Q	A	I	Q	N	R	T
L	N	F	S	V	K	S	E	G	A	K	P	F	S	Q	P	V	I
P	M	T	A	G	L	H	Q	A	A	T	Q	Q	D	S	E	T	M
L	N	E	Q	A	G	W	D	R	V	M	P	M	L	P	N	T	I
N	P	G	Q	M	R	E	P	R	A	G	D	I	H	A	E	T	I
A	L	Y	E	Q	I	G	W	M	T	N	N	P	A	I	G	T	S
T	I	K	K	R	I	I	I	L	G	N	N	K	P	V	P	V	G
E	P	T	S	F	T	D	T	R	Q	L	P	Q	E	R	F	M	Y
S	V	D	R	A	K	K	P	L	A	G	E	E	A	Q	M	E	D
Y	I	L	K	G	G	G	G	S	K	*							V
T	Q	G	V		P	P			A								A

FIGURE 50B-continued

1. Amino acid sequence of p17/24 in membrane bound form [SEQ ID NO: 39]:

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	R	A	W	G
T	M	L	L	G	M	L	M	I	C	S	A	G	A	R	R	P	S	V	
L	S	G	G	E	L	D	R	W	E	K	I	R	L	R	R	P	G	G	
K	S	G	Y	E	L	D	R	I	E	K	I	R	L	R	P	G	G	R	
F	K	K	N	K	L	K	H	E	V	W	A	S	R	E	L	Q	I	L	
G	A	V	Q	P	G	L	L	T	G	S	E	G	C	R	S	K	D	Y	
N	Q	L	A	T	S	Y	Q	V	H	Q	R	I	E	I	K	K	K	T	
K	T	V	A	D	K	I	C	E	E	S	N	K	S	K	N	P	Y	A	
Q	Q	A	A	A	Q	T	G	H	S	H	Q	V	S	Q	N	E	R	P	
I	V	A	N	I	D	G	V	M	V	K	A	F	I	S	P	T	V	T	
L	N	A	W	V	K	S	E	E	A	T	P	Q	D	L	K	N	T	I	
P	M	F	S	A	L	H	Q	G	A	M	Q	M	H	A	A	E	P	M	
L	N	T	V	G	E	W	D	R	A	H	P	V	V	G	G	T	T	I	
N	E	E	Q	A	R	E	P	M	T	S	N	I	P	I	P	R	V	S	
A	P	G	E	M	I	G	W	L	G	N	N	K	A	A	I	F	M	G	
T	L	Y	K	R	W	I	I	R	Q	L	P	K	E	V	V	Q	R	Y	
E	I	T	S	I	L	D	I	L	R	G	N	Q	A	P	P	D	E	D	
S	P	D	R	F	Y	K	T	L	V	A	E	A	N	S	M	M	C	V	
S	V	W	M	T	E	T	L	L	A	Q	N	A	E	P	L	F	I	K	
C	Q	L	K	A	L	G	P	A	K	T	L	V	L	M	L	S	V	A	
I	V	G	V	G	G	P	G	H	I	A	R	A	V	L	L	L	P	M	
N	R	V	R	L	V	Y	S	R	L	V	F	Q	T	H	H	L	P	V	
P	R	G	*	Q	G	Y	S	P	L	S	F	Q	T	T	P	L	P	I	

FIGURE 50B-continued

FIGURE 51A

1. DNA sequence of p17 in natural form [SEQ ID NO: 40]:

atgggtgcgagagcgtcagtattaagcgggggagaattagatcgatgggaaaaaattcg
gttaaggccagggggaaagaaaaaatataaattaaaacatatagtatgggcaagcaggg
agctagaacgatttcgcagttaatcctggcctgttagaaacatcagaaggctgtagacaa
atactgggacagctacaaccatcccttcagacaggatcagaagaacttagatcattata
taatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaagg
aagctttagacaagatagaggaagagcaaaaacaaaagtaagaaaaaagcacagcaagca
gcagctgacacaggacacagcagtcagggtcagccaaaattactaa

2. DNA sequence of p17 in secreted form [SEQ ID NO: 41]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg
gp120 signal peptide
ggcaccatgctccttgggatgttgatgatctgtagtgct**gg**tgcgagagcg

p17

tcagtattaagcgggggagaattagatcgatgggaaaaaattcggttaaggccaggggg
aaagaaaaaatataaattaaaacatatagtatgggcaagcagggagctagaacgattcg
cagttaatcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagcta
caaccatcccttcagacaggatcagaagaacttagatcattatataatacagtagcaac
cctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagctttagacaaga
tagaggaagagcaaaaacaaaagtaagaaaaaagcacagcaagcagcagctgacacagga
cacagcagtcagggtcagccaaaattactaa

3. DNA sequence of p17 in membrane bound form [SEQ ID NO: 42]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg
gp120 signal peptide
ggcaccatgctccttgggatgttgatgatctgtagtgct**gg**tgcgagagcg

p17

tcagtattaagcgggggagaattagatcgatgggaaaaaattcggttaaggccaggggg
aaagaaaaaatataaattaaaacatatagtatgggcaagcagggagctagaacgattcg
cagttaatcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagcta
caaccatcccttcagacaggatcagaagaacttagatcattatataatacagtagcaac
cctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagctttagacaaga
tagaggaagagcaaaaacaaaagtaagaaaaaagcacagcaagcagcagctgacacagga
cacagcagtcagggtcagccaaaattac
ttattcataatgatagtaggaggcttggtagggttaagaatagtttttgctgtactttc
tgtagtgaatagagttaggcagggatattcaccattatcgtttcagacccacctcccaa
tcccgaggggataaa

gp41 transmembrane domain

FIGURE 52B

1. Amino acid sequence of p24 in natural form [SEQ ID NO: 49]:

M	P	I	V	Q	N	I	Q	G	Q	M	V	H	Q	A	I	S	P
R	T	L	N	A	W	V	K	V	V	E	E	K	A	F	S	P	E
V	I	P	M	F	S	A	L	S	E	G	A	T	P	Q	D	L	N
T	M	L	N	T	V	G	G	H	Q	A	A	M	Q	M	L	K	E
T	I	N	E	E	A	A	E	W	D	R	V	H	P	V	H	A	G
P	I	A	P	G	Q	M	R	E	P	R	G	S	D	I	A	G	T
T	S	T	L	Q	E	Q	I	G	W	M	T	N	N	P	P	I	P
V	G	E	I	Y	K	R	W	I	I	L	G	L	N	K	I	V	R
M	Y	S	P	T	S	I	L	D	I	L	Q	R	A	E	Q	S	Q
R	D	Y	V	D	R	F	Y	K	T	L	V	Q	N	A	N	S	P
E	V	K	N	W	M	T	E	T	L	L	V	Q	N	A	N	S	P
C	K	T	I	L	K	A	L	G	P	A	A	T	L	E	E	M	M
T	A	C	Q	G	V	G	G	P	G	H	K	A	R	V	L	*	

2. Amino acid sequence of p24 in secreted form [SEQ ID NO: 50]:

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	P	I	V	Q	N	I
Q	G	Q	M	V	H	Q	A	I	S	P	R	T	L	N	A	W	V
K	V	V	E	E	K	A	F	S	P	E	V	I	P	M	F	S	A
L	S	E	G	A	T	P	Q	D	L	N	T	M	L	N	T	V	G
G	H	Q	A	A	M	Q	M	L	K	E	T	I	N	E	E	A	A
E	W	D	R	V	H	P	V	H	A	G	T	I	A	P	Q	Q	M
R	E	P	R	G	S	D	I	A	G	T	P	S	T	L	E	K	R
I	G	W	M	T	N	N	P	P	I	P	V	G	E	I	Y	S	I
W	I	I	L	G	L	N	K	I	V	R	M	Y	S	P	T	K	F
L	D	I	R	Q	G	P	K	E	P	F	R	D	Y	V	D	R	T
Y	K	T	L	R	A	E	Q	A	S	Q	E	V	K	N	W	M	A
E	T	L	L	V	Q	N	A	N	P	D	C	K	T	I	L	K	G
L	G	P	A	A	T	L	E	E	M	M	T	A	C	Q	G	V	
G	P	G	H	K	A	R	V	L	*								

3. Amino acid sequence of p24 in secreted form [SEQ ID NO: 51]:

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	P	I	V	Q	N	I
Q	G	Q	M	V	H	Q	A	I	S	P	R	T	L	N	A	W	V
K	V	V	E	E	K	A	F	S	P	E	V	I	P	M	F	S	A
L	S	E	G	A	T	P	Q	D	L	N	T	M	L	N	T	V	G
G	H	Q	A	A	M	Q	M	L	K	E	T	I	N	E	E	A	A
R	E	P	R	G	S	D	I	A	G	T	T	S	T	L	Q	Q	M
I	G	W	M	T	N	N	P	P	I	P	V	G	E	I	Y	K	R
W	I	I	L	G	L	N	K	I	V	R	M	Y	S	P	T	S	I
L	D	I	R	Q	G	P	K	E	P	F	R	D	Y	V	D	R	F
Y	K	T	L	R	A	E	Q	A	S	Q	E	V	K	N	W	M	T
E	T	L	L	V	Q	N	A	N	P	D	C	K	T	I	L	K	A
L	G	P	A	A	T	L	E	E	M	M	T	A	C	Q	G	V	G
G	P	G	H	K	A	R	V	L	L	F	I	M	I	V	G	R	L
V	G	L	R	I	V	F	A	V	L	S	V	V	N	R	*		Q
G	Y	S	P	L	S	F	Q	T	H	L	P	I	P	R			

FIGURE 52B

FIGURE 53A

DNA sequence of modified Env including multi-clade V3 loops and Tat
[SEQ ID NO: 52]:

Gaattctgcaacaactgctgtttatccattttcagaattgggtgtcgacatagcagaataggcgt
tactcgacagaggagagcaagaaatggagccagtagatcctagactagagccc

Tat1

Tggaagcatccaggaagtgcgcctaaaactgcttgtaccaattgctattgtaaaaagtgttgctt
tcattgccaaagtttgtttcatacaaaaagccttaggcattctctatggcaggaagaagcggagac
agcgacgaagacctcctcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagta
catgtaatgcaacctatacaaatagcaatagtagcattagtagtagcaataataatagcaatagt
tgtgtgggtccatagtaatcatagaatataggaaaatattaagacaaaagaaaaatagacaggttaa
ttgatagactaatagaaagagcagaagacagtggaatgagagtggaaggagaaatatcagcactt
gtggagatgggggtggagatggg

Envelope

Gcaccatgctccttgggatgttgatgatctgtagtgtacagaaaaattgtgggtcacagtctat
tatggggtacctgtgtggaaggaagcaaccaccactctatttgtgcatcagatgttaaagcata
tgatacagaggtacataatgtttgggccacacatgcctgtgtacccacagaccccaaccacaag
aagtagtatttggtaaatgtgacagaaaaattttaacatgtggaataatgacatggtagaacagatg
catgaggatataatcagtttatgggatcaaagcctaaagccatgtgtaaaattaacccactctg
tgttggagctggtagttgtaacacctca

Delete V1V2, insert Gly,Ala,Gly

gtcattacacaggcctgtccaaaggtatcctttgagccaattcccatacattattgtgccccggc
tggttttgcgattctaaaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtca
gcacagtacaatgtacacatggaattaggccagtagtatcaactcaactgctgttaaattggcagt
ctggcagaagaagaggtagtaattagatctgccaatttcacagacaatgctaaaaccataatagt
acagctgaaccaatctgtagaaattaattgtacaag

First multi-clade repeat

Acccaacaacaatacaagaaaaagtatccgtatccagagaggaccaggagagcatttgttacaa
taggaaaaataggaaatatgagacaagcacattgtctcgggtgtaccagacctaacaacaataca
agaaaaagtgtacgtataggaccaggacaaacattctatgcaacagggtgatataataggggatat
aagacaagcacattgttgtacgagacccaacaataatacaagaaaaagtataaggataggaccag
gacaagcattctatgcaacaggagaaataataggagatataagacaagcacattgttgcacaagg
ccctacaacaataataagacaaaggacccccataggactagggaagcactctatacaacaagaag
aatagaagatataagaagagcacattgttgtaccagaccctccaccaatacaagaacaagtatac
gtataggaccaggacaagtattctatagaacaggagacataacaggagatataagaaaagcatat
tgtggatcctgtacaagacccaacaacaatacaagaaaaagaatatctttaggaccaggacgagt
atattatacagcaggagaaataataggagacatcagaaaggcacattgttgtaccagacctaata
acaatacaagaaaaagtataacttttgcaccaggacaagcgctctatgcaacagggtgaaataata
ggagatataagacaagcacattgtctcgggtgtaccagacctaacaacaata

Second multi-clade repeat

Caagaaaaagtgtacgtataggaccaggacaaacattctatgcaacagggtgatataataggggat
ataagacaagcacattgttgtacgagacccaacaataatacaagaaaaagtataaggataggacc
aggacaagcattctatgcaacaggagaaataataggagatataagacaagcacattgttgcacaa
ggccctacaacaataataagacaaaggacccccataggactagggaagcactctatacaacaaga
agaatagaagatataagaagagcacattgttgtaccagaccctccaccaatacaagaacaagtat
acgtataggaccaggacaagtattctatagaacaggagacataacaggagatataagaaaagcat
attgtggatcctgtacaagacccaacaacaatacaagaaaaagaatatctttaggaccaggacga
gtattttatacagcaggagaaataataggagacatcagaaaggcacattgttgtaccagaccta
taacaatacaagaaaaagtataacttttgcaccaggacaagcgctctatgcaacagggtgaaataa

JOURNAL OF THE

AvaI site, end of two multi-clade repeat

Delete the cleavage site, insert SpeI site

gp41, delete the 300 bp at C-terminal

FIGURE 53B

Amino acid sequence of modified Env including multi-clade V3 loops and Tat
[SEQ ID NO: 53]:

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	T	E	K	L	W	V
T	V	D	Y	G	V	P	V	W	K	E	H	T	T	T	L	F	C
A	S	V	A	K	A	P	D	T	Q	V	V	N	V	W	A	T	H
A	C	F	P	T	D	P	N	P	M	E	H	V	L	W	N	V	T
E	N	L	N	M	W	K	N	D	Q	V	V	Q	M	V	E	D	I
I	S	A	W	D	Q	S	L	K	P	C	E	K	L	H	P	L	C
V	G	E	G	S	C	N	T	S	V	I	T	Q	A	C	P	K	V
S	Q	N	P	I	P	I	H	Y	G	A	P	A	G	T	A	I	L
K	C	C	N	K	T	E	R	G	P	V	S	A	T	N	V	S	T
V	S	L	T	E	G	Q	V	V	I	R	S	E	I	N	L	L	N
G	A	T	I	T	R	K	S	N	Q	S	V	R	G	F	C	R	A
A	P	N	I	G	K	I	G	I	R	I	Q	R	I	P	G	T	R
P	F	T	N	N	N	T	R	I	M	R	Q	A	H	C	L	G	C
F	T	R	I	N	D	I	I	K	S	I	R	I	G	A	P	C	T
T	R	Y	N	E	T	Q	R	D	I	R	Q	A	H	C	Q	C	F
Y	P	A	N	I	I	I	G	R	P	I	G	L	G	C	A	A	T
P	T	T	R	I	E	D	I	R	R	A	H	C	V	Q	R	P	Y
T	T	N	R	T	S	I	R	I	K	P	G	Q	S	T	F	R	S
G	N	D	T	G	D	R	I	K	A	Y	G	G	R	C	Y	R	T
N	A	N	I	R	K	D	I	R	L	A	P	G	C	T	L	Y	P
A	N	E	I	I	G	I	T	R	A	H	G	Q	A	L	C	T	A
N	G	T	I	R	D	I	R	Q	I	G	C	Q	C	T	F	R	R
N	N	I	I	I	K	I	I	I	Q	A	P	C	A	T	R	Y	P
G	N	R	Q	R	T	P	R	G	H	C	Q	C	A	L	P	T	N
N	R	I	E	I	R	G	A	P	G	C	T	R	P	R	T	N	R
R	T	G	D	R	I	K	P	Y	C	V	F	Y	R	Y	T	D	I
T	I	R	I	R	S	A	L	A	H	C	L	R	Y	P	N	N	E
I	K	G	D	I	I	Q	A	P	Q	C	N	I	S	A	G	K	I
N	K	S	I	T	R	Q	H	D	S	G	R	E	Q	F	V	N	W
K	S	T	I	F	K	E	S	S	F	T	K	P	N	I	L	T	H
S	S	F	C	G	S	T	W	R	P	I	Q	S	I	N	T	F	G
S	E	D	I	N	M	P	C	A	L	D	G	G	Q	N	M	W	Q
S	S	V	K	T	L	V	A	T	G	M	R	D	N	S	R	C	S
S	L	E	F	A	P	Q	L	I	E	V	G	I	V	A	P	N	E
A	G	Q	R	Y	V	G	Q	S	M	G	A	A	S	M	T	L	L
G	V	A	G	R	A	Q	S	T	L	Q	Q	Q	V	N	N	I	K
R	Q	I	Q	A	I	Q	H	V	E	R	L	T	K	D	Q	Q	L
L	G	I	S	W	G	S	A	K	L	Q	C	W	T	A	V	P	W
N	E	S	A	D	N	Q	S	N	E	E	I	L	N	H	M	T	I
M	E	W	F	Q	W	N	E	K	N	I	Q	E	I	L	S	L	D
K	K	L	I	P	I	V	W	F	N	V	T	N	W	L	E	Y	I
T	G	E	P	R	R	D	R	S	I	R	G	V	R	I	E	F	A
G	I	W	*	D	R	D	R	S	I	R	L	N	G	I	S	E	A

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FIGURE 54A

DNA sequence of modified Env including multi-clade V3 loops, Tat and Rev
[SEQ ID NO: 54]:

gaattctgcaacaactgctgtttatccattttcagaattgggtgtcgacatagcagaat
aggcggttactcgacagaggagagcaagaa**atg**gagccagtagatcctagactagagccc

Tat1

tggaagcatccaggaagtcagcctaaaactgcttgtaccaattgctattgtaaaaagt
ttgctttcattgccaagtttgtttcataacaaaagccttaggcattctcct**atg**gcagga

Rev1

agaagcgggagacagcgacgaagacctcctcaaggcagtcagactcatcaagtttctcta
tcaaagcagtaagtagtacatgtaatgcaacctatacaaatagcaatagtagcattagt
agtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatataggaaaa
tattaagacaaaagaaaaatagacaggttaattgatagactaatagaaagagcagaagac
agtggca**atg**agagtggaaggagaaatatcagcacttgtggagatgggggtggagatggg

Envelope

Gcaccatgctccttgggatgttgatgatctgtagtgtctacagaaaaattgtgggtcaca
gtctattatggggtacctgtgtggaaggaagcaaccaccactctattttgtgcatcaga
tgctaaagcatatgatacagagggtacataatgtttgggccacacatgcctgtgtacca
cagaccccaaccacagaagtagtattggtaaattgtgacagaaaaattttaacatgtgg
aaaaatgacatggtagaacagatgcatgaggatataatcagtttatgggatcaaagcct
aaagccatgtgttaaaattaacccactctgtgtt**ggagctgg**tagttgtaacacctca

Delete V1V2, insert Gly, ala, gly

gtcattacacaggcctgtccaaaggtatcctttgagccaattcccatacattattgtgc
cccggctggttttgcgattctaaaatgtaataataagacggtcaatggaacaggaccat
gtacaaatgtcagcacagtacaatgtacacatggaattaggccagtagtatcaactcaa
ctgctgtttaaattggcagtctggcagaagaagaggtagtaattagatctgccaatctac
agacaatgctaaaaccataatagtacagctgaaccaatctgtagaaattaatt**gt**tacaa
g

First multi-clades repeat

Acccaacaacaataacaagaaaaagtatccgtatccagagaggaccaggagagcatttg
ttacaataggaaaaataggaaatatgagacaagcacattgtctcgggtgtaccagacct
aacaacaatacaagaaaaagtgtacgtataggaccaggacaaacattctatgcaacagg
tgatataataggggatataagacaagcacattggtgtacgagacccaacaataatacaa
gaaaaagtataaggataggaccaggacaagcattctatgcaacaggagaaataatagga
gatataagacaagcacattggtgcacaaggccctacaacaatataagacaaaggacccc
cataggactaggggcaagcactctatacaacaagaagaatagaagatataagaagagcac
attggtgtaccagaccctccaccaatacaagaacaagtatacgtataggaccaggacaa
gtattctatagaacaggagacataacaggagatataagaaaagcatattgtggatcctg
tacaagacccaacaacaatacaagaaaaagaatatcttttaggaccaggacgagtat
atacagcaggagaaataataggagacatcagaaaggcacattggtgtaccagacctaat
aacaatacaagaaaaagtataacttttgcaccaggacaagcgtctatgcaacagggtga
aataataggagatataagacaagcacattgtctcgggt**gt**taccagacctaacacaata

Second multi-clade repeat

caagaaaaagtgtacgtataggaccaggacaaacattctatgcaacagggtgatataata
ggggatataagacaagcacattggtgtacgagacccaacaataatacaagaaaaagtat

FIGURE 54A-continued

aaggataggaccaggacaagcattctatgcaacaggagaaataataggagatatagac
aagcacattgttgcacaaggccctacaacaatatagacaaaggacccccataggacta
gggcaagcactctatacaacaagaagaatagaatatagaagagcacattgttgtac
cagaccctccaccaatacaagaacaagtatacgtataggaccaggacaagtattctata
gaacaggagacataacaggagatatagaaaagcatattgtggatcctgtacaagacc
aacaacaatacaagaaaaagaatatctttaggaccaggacgagtattttatacagcagg
agaaataataggagacatcagaaaggcacattgttgtaccagacctaataacaatacaa
gaaaaagtataacttttgcaccaggacaagcgctctatgcaacagggtgaaataatagga
gatataagacaagcacattgtctcgggaacattagtagagcaaaatggaataacacttt

AvaI site, end of two multi-clade repeat

Aaaacagatagatagcaaattaagagaacaatttggaaataataaaacaataatcttta
agcagtcctcaggaggggacccagaaattgtaacgcacagttttaattgtggaggggaa
tttttctactgtaattcaacacaactgtttaatagtacttggtttaatagtacttggag
tactaaaggggtcaaataacactgaaggaagtgcacacatcacctcccatgcagaataa
aacaattataaacatgttggcaggaagtaggaaaagcaatgtatgccccctcccatcagt
ggacaaattagatgttcatcaaatattacagggctgctattaacaagagatgggtggtaa
tagcaacaatgagtcgagatcttcagacctggaggaggagatatgaggggacaattgga
gaagtgaattatataaatataaagtagtaaaaaattgaaccattaggagtagcaccacc
aaggcaaagagaagagtgtgtgcagactagtgcagtgggaataggagctttgttccttgg

Delete the cleavage site, insert SpeI

gttcttgggagcagcaggaagcactatgggctgcacgtcaatgacgctgacggtacagg
ccagacaattattgtctgatatagtgcagcagcagaacaatttgcctgagggtattgag
gcgcaacagcatctgttgcactcacagctctggggcatcaaacagctccaggcaagaat
cctggctgtggaaagatacctaaaggatcaacagctcctggggatttgggggttgcctctg
gaaaactcatttgcaccactgctgtgccttgggaatgctagttggagtaataaatctctg
gaacagatttgggaataacatgacctggatggagtgggacagagaaattaacaattacac
aagcttaatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaag
aattattggaattagataaatgggcaagtttgtggaattggtttaacataacaaattgg
ctgtggtatataaaattattcataatgatagtaggaggcttggtaggtttaagaatagt
ttttgctgtactttctatagtgaatagagtttaggcagggatattcaccattatcgtttc
agaccacctcccaatcccagggggacccgacaggcccgaaggaatagaagaagaaggt
ggagagagagacagagacagatccattcgattagtgaacggatccttagcacttatctg
ggacgatctgaggagcctgtgcctcttcagctaccaccgcttgagagacttactcttga
ttgtaacgaggattgtggaacttctgggacgcaggggtgggaagccctcaaatattgg
tggaatctcctacagtattggagtcaggaactaaagaatagtgtgttaacttgctcaa
tgccacagccatagcagtagctgagtaa

gp41, but 99 bp truncation at C-terminal

FIGURE 54B

Amino acid sequence of modified Env including multi-clade V3 loops, Tat and Rev

[SEQ ID NO: 55]:

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	T	E	K	L	W	V
T	V	Y	Y	G	V	P	V	W	K	E	A	N	T	T	L	F	C
A	S	D	A	K	A	Y	D	T	E	V	H	V	V	W	A	T	H
A	C	V	P	T	D	P	N	P	Q	E	V	V	L	V	N	V	T
E	N	F	N	M	W	K	N	D	M	V	E	Q	M	H	E	D	I
I	S	A	G	S	Q	N	T	S	V	C	V	K	L	T	P	K	V
S	F	E	P	I	C	I	H	Y	C	A	P	A	G	C	A	I	L
K	C	N	N	K	T	F	N	G	T	G	S	C	T	N	V	S	T
V	Q	C	T	H	G	E	R	P	V	V	S	A	Q	L	L	L	N
G	S	L	A	E	E	E	V	V	I	R	S	E	N	F	T	D	N
A	K	N	I	I	V	Q	L	N	Q	I	Q	R	I	N	C	R	R
P	V	T	N	T	K	I	G	N	M	R	Q	A	G	P	G	G	A
F	R	P	N	G	N	T	R	K	S	V	R	I	H	C	C	Q	C
T	Y	A	N	N	D	I	I	G	D	I	R	Q	A	H	G	C	T
F	P	N	T	E	T	R	K	S	I	R	I	G	P	G	Q	A	F
R	A	T	G	I	I	I	G	D	I	R	Q	A	H	C	C	T	R
Y	T	N	R	I	R	Q	I	T	P	I	G	L	G	Q	A	R	Y
P	T	I	R	T	S	D	I	R	R	A	H	C	V	T	F	R	S
T	G	D	T	G	K	I	R	K	G	Y	G	Q	S	C	R	R	T
G	N	N	I	R	G	R	I	S	L	G	P	G	R	V	F	Y	P
A	N	E	T	I	S	D	I	R	K	A	H	C	C	T	R	P	N
N	G	N	I	K	D	I	T	F	A	P	G	Q	A	L	Y	A	T
G	N	T	I	G	K	I	V	Q	I	G	C	L	Q	C	T	Y	P
N	G	N	R	I	S	I	R	R	Q	H	C	G	C	T	F	P	A
G	N	E	I	G	D	I	R	I	G	C	Q	C	A	F	Y	T	N
N	R	I	Q	R	T	P	I	G	L	C	Q	A	T	R	T	T	R
R	T	S	I	R	I	G	A	H	C	V	F	R	P	T	G	N	I
T	G	D	R	I	K	A	Y	C	G	S	C	T	R	N	A	N	E
T	I	K	S	T	R	F	A	P	Q	L	L	Y	A	T	G	E	T
I	R	G	N	I	Q	A	H	C	K	G	N	I	S	R	A	N	I
N	K	T	I	K	Q	I	D	S	S	L	D	E	Q	F	A	K	W
K	S	F	I	G	G	E	S	F	Y	C	N	S	T	I	V	F	H
S	S	T	C	N	S	T	W	S	T	K	Q	I	N	N	T	E	N
S	E	D	F	T	L	P	C	R	I	I	S	G	I	I	M	W	Q
S	V	G	K	A	M	Y	A	P	P	D	G	G	Q	N	R	C	S
S	N	I	F	R	P	G	G	T	D	M	R	D	N	S	R	S	E
L	Y	K	R	V	V	V	T	S	E	V	L	G	V	A	P	F	L
A	G	F	A	Q	A	Q	S	T	M	G	C	T	S	M	T	L	T
V	Q	A	E	A	Q	Q	L	D	I	Q	Q	T	Q	N	N	I	L
R	L	I	Q	A	I	L	S	V	L	R	I	T	K	D	Q	I	K
Q	L	S	W	G	N	K	A	K	E	I	C	W	N	H	V	P	W
N	M	E	D	N	E	I	N	N	Y	T	S	L	I	L	M	T	I
E	K	E	Q	N	Q	Q	W	F	N	I	Q	E	L	L	E	L	D
K	V	L	S	I	I	N	V	G	Q	G	Y	S	W	P	V	Y	I
T	H	L	I	P	P	R	R	P	D	R	P	E	G	I	S	F	Q
G	G	W	D	R	R	D	R	S	I	R	L	V	N	G	R	E	A
L	I	L	L	I	V	T	S	I	C	E	F	Q	Y	R	R	L	R
D	L	L	K	Y	W	L	N	A	V	A	I	A	S	A	E	G	W
E	A	A	V	N	L	L	N	A	T	Q	I	W	V	A	E	*	K

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30055

atgttcttagggaagatctggccttctacaagggaaggccaggggaattttcttcagagcagaccagagcca
acagccccaccatttcttcagagcagaccagagccaacagccccaccagaagagagcttcaggtctggggt
agagacaacaactccccctcagaagcaggagccgatagacaagggaactgtatcctttaacttccctcagatc
actctttggcaacgacccctcgtcacaataaagataggggggcaactaaagggaagctctattagatacagga
gcagatgatacagtattagaagaaatgagtttgcagggaagatggaaacaaaaatgataggggggaattgg
aggttttatcaaagtaagacagtatgatcagatactcatagaaatctgtggacataaagctataggtacagtatt
agtaggacctacacctgtcaacataattggaagaaatctgttgactcagattggttgcactttaaattttaa

Amino acid sequence of HIV-1 (strain BH10) Protease (PI) [SEQ ID NO: 57]:

[illegible]

FIGURE 57

Primers for multi-clade V3 loops:

Clade A: (1). forward primer A888F5 [SEQ ID NO: 60]:

5'-aaa tca acc gga att gaa ttc cct cgg gtg tac cag acc taa caa caa tac-3'
EcoRI Aval

(2). reverse primer A-CR3 [SEQ ID NO: 61]:

5'-att gtt ggg tct cgt aca aca atg tgc ttg tct tat atc ccc-3'

Clade C: (3). forward primer A-CF5 [SEQ ID NO: 62]:

5'-ggg gat ata aga caa gca cat tgt acg aga ccc aac aat ac-3'

(4). reverse primer C980R3 [SEQ ID NO: 63]:

5'-ggt gta ggg cct tgt gca aca atg tgc ttg tct tat atc -3'

Clade D: (5). forward primer D888F5 [SEQ ID NO: 64]:

5'-gat ata aga caa gca cat tgt tgc aca agg ccc tac aac-3'

(6). reverse primer D-ER3 [SEQ ID NO: 65]:

5'-ggt gga ggg tct ggt aca aca atg tgc tct tct tat -3'

Clade E: (7). forward primer D-EF5 [SEQ ID NO: 66]:

5' -ata aga aga gca cat tgt tgt acc aga ccc tcc acc-3'

(8). reverse primer E998R3 [SEQ ID NO: 67]:

5'-gta ttg ttg ttg ggt ctt gta caa caa tat gct ttt ctt ata tct cc-3'

Clade F: (9). forward primer F888F5 [SEQ ID NO: 68]:

5'-gga gat ata aga aaa gca tat tgt tgt aca aga ccc aac aac aat ac-3'

(10). reverse primer F-GR3 [SEQ ID NO: 69]:

5'-ggt att agg tct ggt aca aca atg tgc ctt tct gat gtc-3'

Clade G: (11). forward primer F-GF5 [SEQ ID NO: 70]:

5'-gac atc aga aag gca cat tgt tgt acc aga cct aat aac-3'

(12). reverse primer G989R3 [SEQ ID NO: 71]:

5'-aat aaa cta gtc tag acc ccc gag tct aga aca atg tgc ttg tct tat atc tcc-3'
Aval XbaI